CORRECTIVE ACTION PLAN

SAUER-DANFOSS INC.
2800 EAST 13TH STREET
AMES, IOWA

Prepared For:

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November 2010

FEHR-GRAHAM & ASSOCIATES
Engineering and Science Consultants

Civil • Surveying • Municipal • Structural • EHS • IT

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1.0 EXECUTIVE SUMMARY

This Corrective Action Plan (CAP) for Sauer-Danfoss Inc., located at 2800 East 13th Street, Ames, Iowa (please see Figure 1 and Figure 2), has been completed by Fehr-Graham & Associates (FGA) for the purpose to develop a more aggressive approach to groundwater remediation.

To better understand the contaminant conditions occurring below the water table, four (4) soil borings were completed, each a distance of approximately 10 feet north, south, east, and west from the well MW-R13 on September 2, 2010. Soil samples collected for Volatile Organic Compounds (VOCs) were collected consistent with the procedure established per SW-846 Method 5035, and sample analysis parameters consisted of Acetone, 1,1-Dichloroethane, 1,2-Dichloroethane, 1,1-Dichloroethylene, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene, Methylene Chloride, Tetrachloroethylene, 1,1,1-Trichloroethane, 1,1,2-Trichloroethane, Trichloroethylene, Vinyl Chloride, and Xylene (total) by SW-846 Method 8260. Additional analysis parameters included 1,4-Dioxane, Alkalinity, Sulfate/Sulfide, Nitrate/Nitrite, pH, Total Organic Carbon, RCRA 8 Inorganics along with Cr^{6+}, Cu, and Fe.

A total of three (3) slug-in tests were also conducted and included the wells MW-10, MW-R13, and MW-R14 to assess the spatial distribution of hydraulic conductivity within the unconfined aquifer composing the contaminant zone. Results of the slug tests indicate an approximate two order of magnitude range in calculated hydraulic conductivity.

General conclusions upon completion of this CAP include the initial design of a phased remediation approach using an injection grid in an approximate 2,500 square feet area to remediate VOCs including specific isomers and 1,4-Dioxane around and including the well MW-R13.

2.0 BACKGROUND

2.1 Groundwater Pump and Treat

Sometime during 1997, a collection trench was installed and began operation as a groundwater recovery system with permitted discharge to the City of Ames sanitary sewer system. Quarterly Non-Domestic Waste Pretreatment Program reports are submitted to the City to comply with their permitting requirements. Specific details of the system installation are unknown or unavailable; however, from cross-sections prepared by MWH, it appears the trench width is a minimum of 4-inches using perforated high density polyethylene (HDPE) drainage tile. The sump pit appears to be set to a total depth of 24.3 feet into the underlying till facies. Granular backfill appears to have been placed from the base of the tile to a depth of approximately 5 feet below surface grade. Native soil may appear to have been placed above the granular backfill to surface grade.

Considering the collection trench has operated, though intermittently during specific periods, but overall the greater part of 13 years, it is acknowledged minimal contaminant mass reduction has occurred, only small-scale natural attenuation (please see Table 1 and Table 2). However, the goal of the collection trench was to intercept off-site contaminant flux, to which excluding the area of the wells MW-18, MW-19, and MW-33, appears to have accomplished this goal. If forecasting were to occur to project the estimated time of operation necessary to completely remediate to MCLs for all applicable constituents, it is expected all derived estimates would be based on contaminant half-lives considering active source reduction or removal does not currently occur. To more aggressively address the contaminant source area, which is understood to coincide with the region that surrounds and includes the well MW-R13, it is proposed to conduct in-situ chemical oxidation (ISCO) to remediate VOC and 1,4-Dioxane

impacts to soil below the water table and to groundwater. Indicator contaminants include Acetone, 1,1-Dichloroethane, 1,2-Dichloroethane, 1,1-Dichloroethylene, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene, Methylene Chloride, Tetrachloroethylene, 1,1,1-Trichloroethane, 1,1,2-Trichloroethane, Trichloroethylene, Vinyl Chloride, Xylene (total), and 1,4-Dioxane. Those constituents exceeding MCLs are susceptible to mass reduction with ISCO using Klozur® activated sodium persulfate by FMC Corporation.

2.2 Soil Boring Investigation

On September 2, 2010, FGA and contractors from Saberprobe, LLC, completed a total of four (4) soil borings to a depth of approximately 20 feet each in the vicinity of the well MW-R13 (please see Figure 3). The upper water bearing materials to a depth of approximately 19 feet include the Morgan Member of the Dows Formation and were field characterized as brown silty lean clay to lean clay with silt and fine- to coarse-grained sand in silt/clay matrix, generally cohesive with a few horizontal fractures noted throughout, oxidized, soft to firm, and leached to unleached. Below the Morgan Member, the Alden Member of the Dows Formation is described as gray silty lean clay with fine- to coarse-grained sand in silt/clay matrix, unoxidized, massive, cohesive, firm to hard, and unleached (please see Appendix A for soil boring logs). The water table depth during drilling was estimated at approximately 7 feet below surface grade while the measured water depth at the adjacent monitoring well MW-R13 screened, presumably, across the Morgan Member and Alden Member was 6.88 feet below top of casing or approximately 3.7 feet below surface grade (please see Table 3).

Contaminant distributions occurring in soil below the water table appear to reflect the greatest level of contaminant occurrence near or at the contact of the Morgan Member and Alden Member (please see Appendix B). This is not unexpected and is likely a function of the hydraulic and bulk material properties of the Morgan Member as compared to the Alden Member along with the physical properties of the indicator contaminants.

2.3 Monitoring Well Installation

Also on September 2, 2010, FGA and contractors from Saberprobe, LLC, completed the monitoring well MW-34 located near the southwest corner of the Sauer Danfoss property to satisfy current groundwater monitoring requirements by defining the lateral extent of the groundwater contamination occurring at the well MW-12 (please see Figure 3). The upper water bearing materials to a depth of approximately 19 feet include the Morgan Member of the Dows Formation and were field characterized as brown silty lean clay to lean clay with silt and fine- to coarse-grained sand in silt/clay matrix, generally cohesive with a few horizontal fractures noted throughout, oxidized, soft to firm, and leached to unleached. Below the Morgan Member, the Alden Member of the Dows Formation is described as gray silty lean clay with fine- to coarse-grained sand in silt/clay matrix, unoxidized, massive, cohesive, firm to hard, and unleached (please see Appendix B for soil boring logs and monitoring well diagram). The water table depth during the soil boring completion was estimated at approximately 6 feet below surface grade. However, during auger advancement at the time of monitoring well installation, saturated sand/gravel was encountered at approximately 9 feet below surface grade. The top of the monitoring well screen was set to a depth of approximately 9 feet below surface grade to intercept the flux of water moving through the sand/gravel.

3.0 GEOLOGIC AND HYDROGEOLOGIC SETTING

3.1 Geology

The document Groundwater Resources – Story County, Open File Report 82-85 WRD, identifies the Site in an area of Quaternary glacial drift (undifferentiated) consisting predominately of glacial till containing scattered, irregular bodies of sand and gravel. The Pennsylvanian Cherokee Group is the uppermost bedrock unit and is expected at a minimum depth of approximately 100 feet. The Cherokee Group is generally described as producing low yields from the limestone and sandstone.

According to the Surficial Geologic Map of the Des Moines Lobe of Iowa Boone and Story Counties (2001), the Site appears to be situated in an area dominated by fill materials and Till Plain with Lineated Ridge Forms.

The fill material is described as variable in texture and associated with railroad grades, highway grades, and land leveling. Fill materials were not clearly evident during the soil investigation conducted on September 2, 2010. The Till Plain is described as less than 8 meters of yellowish to grayish brown, calcareous, fractured, stratified loam to silt loam to sandy loam diamicton; textures can be quite variable and overlies gray, calcareous, massive, dense loam diamicton (Dows Formation - Alden Member) of low relief (less than 3 meters local relief) to slightly undulating plains with irregular surface patterns. The Aligned Ridge Forms (Dows Formation - Morgan Member) consist of less than 8 meters of yellowish brown, often calcareous, stratified loam to silt loam to sandy loam diamicton; textures can be quite variable. Evidence of shearing is sometimes present. The publication Depositional Environments of Glacial Sediments and Landforms on the Des Moines Lobe, Iowa (1981), describes the Morgan Member as supraglacial till and tends to be variable in morphology and properties. It is characterized as

supraglacially-deposited till-like sediments and associated meltwater deposits averaging about 14% clay, 42% silt, and 44% sand, with a mean bulk density of 1.62 g/cc. The Morgan Member overlies gray, calcareous, massive, dense loam diamicton assigned to the Alden Member. Well to moderately well defined lineated ridges, oriented transverse to glacier flow are inset on till plain. Ridges are moderate to high relief features (3-8+ meters). Overall landform exhibits swell and swale topography. The publication Depositional Environments of Glacial Sediments and Landforms on the Des Moines Lobe, Iowa (1981), describes the Alden Member as the basal till, generally, but with a few exceptions, uniform texturally and mineralogically. It is characterized as light loamy in texture averaging about 15% clay, 37% silt, and 48% sand in the matrix, with a mean bulk density of 1.89 g/cc. Please see Figure 4 for cross-sections.

3.2 Hydrogeology

The hydrogeology of the flow system appears to reflect an unconfined or water table condition (please see Figure 5) with variable complexity due in response to a network of sand or gravel lenses or both of unknown continuity. In the area of the well MW-R13, the flow system appears to have a greater transmissivity than in the area of the well MW-34. For example, in the area of the well MW-R13, the water table is assumed to occur at approximately 7 feet below surface grade as determined during completion of the 4 soil borings B-1 through B-4 on September 2, 2010. The aquifer base is estimated at the contact of the Morgan Member and Alden Member at approximately 19 feet below surface grade. At the well MW-34, it is estimated the bulk of the flow occurs over the range in depth of approximately 8 feet to 15 feet in response to poor or no recovery from 8 feet to 10 feet, and 12 feet to 15 feet, collectively assumed to be sand or gravel or both of variable texture.

Variable conductivities are expected from the water table to a depth of approximately 19 feet below surface grade in response to numerous sand/gravel lenses of unknown lateral connectivity. It is clear, however, the formation is moving water based upon calculated hydraulic conductivities. Hydraulic conductivities were calculated as 6.254E-05 cm/sec at the well MW-R13, 2.515E-04 cm/sec at the well MW-10, and 1.04E-03 cm/sec at the well MW-R14 (please see Table 4 and Appendix C).

4.0 CORRECTIVE ACTION OPTIONS

All options discussed below are believed applicable and possess the potential to remediate all of the indicator contaminants. The contaminant 1,4-Dioxane, however, has a very low octanol-water partition coefficient (K_{ow}) and organic carbon partition coefficient (K_{oc}) along with a low solubility and Henry's Law constant. Thus, conventional technologies such as air stripping is unable to cost effectively remediate.

Included on Figure 6 and Figure 7 are the distributions of indicator contaminants in soil and groundwater, respectively, that were evaluated to assist in preparation of the discussion to follow.

4.1 In-Situ Chemical Oxidation

Chemical oxidation operates as a very robust remediation technology provided several factors are fully considered. These include stochiometry and dose; in addition, the geology, reduced metals, and location and type of buried utilities must also be evaluated. Considering the chemical oxidant must come in contact with the specific contaminant for the reaction to occur, a number of processes describe the reaction mechanisms. Chemical oxidation reactions with

organic contaminants are favorable or spontaneous reaction as described by the Gibbs free energy and by the entropy of reactants to products considering enthalpy must decrease. Most, if not all, chemical oxidation reactions involving organic contaminants are exothermic to some degree. Thus, of critical importance is the management or dissipation of generated heat. The amount of heat is a function of the Gibbs free energy, entropy, and reaction kinetics. Generated heat from chemical oxidation is not expected to be problematic due in response to injections occurring within an open field with no incompatible utilities known in the vicinity. It should also be noted ambient dissolved oxygen, oxidation-reduction potential, and pH measurements appear favorable for ISCO deployment (please see Table 5).

4.2 In-Situ Chemical Reduction

In-Situ Chemical Reduction can be applicable to remediation of chlorinated volatile organic compounds (VOC) and occurs, primarily through any one or combination of several to include biological, cometabolic, and abiotic processes. Stochiometry and kinetics are difficult or may approach impossible to predict simply because of the number of processes occurring at any specific time and general dependence upon biological elements such as bacteria to ferment hydrogen, the ability to sustain cofactors to indirectly and anaerobically remediate chlorinated VOCs, or abiotic components that are strong reductants such as zero valent iron. These mechanisms can sometimes produce quick responses for the more oxidized (more chlorinated) constituents such as Tetrachloroethylene and Trichloroethylene, however, much slower kinetics typically occur for the less oxidized (less chlorinated) constituents such as 1,2-Dichloroethylene (cis+trans) and Vinyl Chloride. It should be noted the chemical 1,4-Dioxane is recalcitrant with respect to In-Situ Chemical Reduction, thus, this method of groundwater remediation has not been explored any further.

4.3 Groundwater Re-circulation

Another option is to set an array of 2-inch injection wells upgradient from the understood source area near and at the well MW-R13. The injection wells would be manifolded from a polyethylene tank with shut off valves from gravity fed oxidant mixed with potable water. As the oxidant moves through the formation, contaminants are oxidized and subsequently collected by the existing groundwater capture system. Recovered oxidant mixed with formation water could then be transfer pumped by buried conduit back to the polyethylene tank. Manual oxidant additions would occur during monthly O&M events and all oxidant would be secured on-site. Tank-full shut-offs would engage the gravity feed manifolded to the injection wells to cycle through the process. Although one component of the system would already be in place, namely the groundwater capture, the capitol involved in retrofitting and modifying to include drilling of injection wells along with plumbing of manifold, labor, and material costs for conduit at appropriate grade and size, engineer cost to size transfer pump(s) then rent or purchase transfer pump(s), electrician cost to bring electric to transfer pump(s) or tie into electric at submersible, rental or purchase of polyethylene tank with piping, sensor(s), secured and heated enclosure(s), monthly electric cost, and labor for monthly O&M is expected as high in cost. Discharge to the City of Ames wastewater system would no longer apply, thus, eliminating those costs. It is expected the costs to implement groundwater recirculation would greatly exceed other available options with nominal increases in performance. Thus, further exploration of this technology is not included.

4.4 Air Sparge/Soil Vapor Extraction

This technology can be very effective at reducing contaminant mass and inhibiting the off-site migration of soil vapors along preferential pathways and dissolved in groundwater. Several obstacles to the successful deployment exist and include shallow water tables and cohesive sediments contained within the well screen of either or both air sparge and soil vapor extraction. Both are noted in this example except the extent to which it would affect the determination of success is unknown and would require a pilot test. The pilot test could be accomplished using a portable trailer after installing one (1) 2-inch air sparge well and one (1) 2-inch soil vapor extraction well. Existing monitoring wells or installation of piezometers might assist in vacuum influence and sparge influence. Considering the challenges in effectively remediating the constituent 1,4-Dioxane based on its low Henry's Law constant, in addition to unknown viability of air sparge along with soil vapor extraction without installing pilot test wells and conducting the pilot test, further exploration of this technology has not been conducted.

5.0 TECHNOLOGY SELECTION

The approach is to conduct phased remediation by in-situ chemical oxidation (ISCO) using the amendment sodium persulfate, Klozur® mixed to 20% by weight with the activator sodium hydroxide at 25% by weight and potable water. The sodium hydroxide will first be added to potable water enclosed within a polyethylene tank in ratios of 12.7 gallons of 25% sodium hydroxide to 48 gallons of potable water. An extra 10% must be added to the total mass of sodium hydroxide to increase the pH of the soil and groundwater to 11, accounting for acid generation and buffering capacity of the soil, thus deriving 14 gallons of 25% sodium hydroxide by weight and 34 gallons of potable water. Next, 100 pounds of Klozur® sodium persulfate will

be added to the polyethylene tank (or equivalent and compatible) to produce a solution of approximately 53 gallons of a 20 weight percent persulfate solution. If mixing ratios are adjusted, the general rule presented above remains except the total volume of the polyethylene tank or appropriate and compatible containment device will be divided by 53 gallons. The resultant factor will be applied to all gallon totals to derive an equivalent mixing ratio.

The calculated total contaminant mass considering only TCA, PCE, DCA, DCE, TCE, Methylene Chloride, Vinyl Chloride, and 1,4-Dioxane is approximately 45.3 pounds and was derived by FMC Corporation based on maximum groundwater contaminant concentrations per constituent (expressed in mg/L) and the sum of contaminant concentrations in soil at each of the 4 borings completed in September 2010 (expressed in mg/kg) also accounting for soil oxidant demand although a default value was assigned since unknown (please see Appendix D). This approach may underestimate the total contaminant mass based on large monitoring well spacing except the design does include the full saturated thickness from the water table to the base of the Morgan Member.

One approach is to inject Persulfate without an activator except it has a generally slow reaction kinetic in the subsurface and is generally applicable to only a few specific contaminants. To effectively remediate the contaminant 1,4-Dioxane a higher oxidation potential is necessary. The sulfate radical can be formed by activating Persulfate with the benefit of remediating a larger range of contaminants but it's very reactive and kinetics are quite fast.

An area of approximate size of 2,500 square feet is anticipated for the initial injection and will include the monitoring well MW-R13 as well as the borings B-1 through B-4. The expected arrangement of injection points during the initial phase is to essentially duplicate a grid. The grid is proposed approximately 50 feet in an east-west dimension and approximately 50 feet in a

north-south dimension to equal approximately 2,500 square feet (please see Figure 8). Grid spacing is proposed at 5 feet and is reflected as the estimated radius of influence for a total number of 100 injection points and approximately 45.3 pounds of persulfate per injection point. This may be field adjusted as more information and data becomes available.

6.0 CONFIRMATION SAMPLING PLAN

To assist in the determination of the success of the proposed remediation, ultimately, a reduction in contaminant mass will need to be demonstrated. It is acknowledged, however, one relatively common occurrence of the oxidation process is contaminant rebound in response to desorption or partitioning to dissolved phase. Since the injections are proposed in the understood source area, some rebound may occur in response to incomplete destruction or desorption, but would be addressed through subsequent amendment addition(s). It is expected at a minimum two (2) amendment addition events to occur. Current contaminant mass is calculated at or about 45.3 pounds, which is largely a function of TCA, PCE, DCA, DCE, TCE, Methylene Chloride, Vinyl Chloride, and 1,4-Dioxane concentrations, respectively, thus subsequent sampling efforts should demonstrate a total mass less than 45.3 pounds as it approaches or achieves each contaminant's MCL. To assist in the estimation of the radius of influence, at a minimum each injection day a downhole meter will be used to check dissolved oxygen, pH, ORP, specific conductance, and temperature at the monitoring wells MW-10, MW-R13, and MW-R14, with baseline conditions documented prior to initiating the injection.

Post injection confirmation groundwater samples will be collected from the wells MW-10, MW-R13, and MW-R14 approximately one month and three months after completion of the initial injection, and at the time of annual groundwater sampling in October. Analysis

parameters will include, at a minimum, the VOCs Acetone, 1,1-Dichloroethane, 1,2-Dichloroethane, 1,1-Dichloroethylene, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene, Methylene Chloride, Tetrachloroethylene, 1,1,1-Trichloroethane, 1,1,2-Trichloroethane, Trichloroethylene, Vinyl Chloride, and Xylene (total) by SW-846 Method 8260, along with 1,4-Dioxane. Field collection of dissolved oxygen, oxidation-reduction potential, pH, specific conductance, temperature, and sulfate using either sensors mounted to the flow-through cell attached to the bladder pump of the low flow sampling equipment or test kits will also occur. Please see Table 6. Results from the groundwater sampling conducted three months after the initial injection will be used to assist in the design of the subsequent amendment addition. If during performance of the initial injection formation acceptance rates are not favorable or subsequent groundwater results do not specifically identify a net reduction in contaminant mass expected to have resulted from poor acceptance rates, soil mixing may be considered.

A total of seven (7) confirmation soil samples will be collected from within the Morgan Member at equivalent depths as previous efforts using SW-846 Method 5035 and include the analysis SW-846 Method 8260 for Acetone, 1,1-Dichloroethane, 1,2-Dichloroethane, 1,1-Dichloroethylene, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene, Methylene Chloride, Tetrachloroethylene, 1,1,1-Trichloroethane, 1,1,2-Trichloroethane, Trichloroethylene, Vinyl Chloride, and Xylene (total). Additional analysis parameters will include 1,4-Dioxane and pH. A total of two (2) confirmation soil samples will also be collected from the Alden Member to document post-injection conditions as they relate to the specific VOCs identified above. Soil confirmation sampling will occur upon successful demonstration all groundwater results are less than applicable MCLs. Please see Table 6.

7.0 QUALITY ASSURANCE

The quality assurance (QA) and quality control (QC) requirements ensure that the environmental data collected during this project is of the highest standard feasible, as appropriate for the intended application. Specific procedures for sampling, COC, laboratory instrument calibration, laboratory analysis, reporting of data, internal quality control, audits, preventative maintenance of field equipment, and corrective action are described in sections of the approved Sampling and Analysis Plan, where applicable.

Soil and groundwater samples were collected in accordance with the project-specific Sampling Analysis Plan or FGA SOPs. Sample-handling procedures included field documentation, COC documentation, sample shipment, and laboratory sample tracking. The possession and handling of samples were documented from the time of collection to delivery to the laboratory. Field personnel maintained custody of all samples until they were relinquished to another custodian, the laboratory, or to the freight shipper. Samples were packaged and transported in a manner that maintained the integrity of the sample(s) and permitted the analysis to be performed within the prescribed holding time. Samples were either couriered or shipped via overnight to the lab.

Instruments used to gather, generate, or measure field environmental data were calibrated with sufficient frequency and in such manner that accuracy and reproducibility of results were consistent with the manufacturer's specifications. Field instruments include the use of PID to detect VOCs, pH, specific conductance, dissolved oxygen, oxidation-reduction potential, and temperature sensors. As applicable, field instruments were calibrated daily prior to use.

Field-sampling precision and data quality were evaluated through the use of sample duplicates, equipment blanks, preservative blanks, and trip blanks. Sample duplicates provided precision information regarding homogeneity, handling, transportation, storage, and analysis.

Equipment blanks were used to ensure that proper decontamination procedures were performed and that no cross contamination occurred during sampling or transportation. Trip blanks and preservative blanks were used with VOCs only to ensure that transportation and/or the preservation of the samples did not introduce contamination. Field QC samples are detailed below.

- Field Duplicate:

  The field duplicate will be sampled at the same location as an investigative sample. The field duplicate should be collected side by side and in the same order as the investigative sample (e.g. collect investigative VOC sample then collect the VOC field duplicate). The field duplicate represents the precision of the field collection and lab methods and site heterogeneity.

- Matrix Spike/Matrix Spike Duplicate (MS/MSD):

  An additional sample set should be collected in duplicate in the same fashion as the field duplicate. These samples are collected for the laboratory's quality control. The samples should be collected in an area where contaminants are assumed to be low, as the presence of contaminants may interfere with the laboratory's spike.

- Equipment Blank:

  A sample is collected by pouring over, or running laboratory-prepared water or distilled water through the field sampling equipment after decontamination and/or before sample collection. The sample is collected in the appropriate analytical containers with the proper preservative, identical to the samples. Equipment blanks must be submitted to the laboratory with investigative samples and analyzed for the same parameters as the investigative samples. The equipment blank represents background contamination resulting from field equipment, sample procedure, sample container, preservative, and shipment.

- Trip Blank:

  This sample is collected at the laboratory using analyte free water in the appropriate sample containers with the proper preservative, taken out in the field, and returned to the laboratory for analysis without being opened. Trip blanks are required only when VOCs will be analyzed. Trip blanks will be submitted at the rate of one trip blank per shipping container of VOCs. Trip blanks are used to assess contamination introduced during sample transport.

- Preservative Blank:

  Preservative blanks will be analyzed only when VOCs are collected, as necessary. A set of methanol or sodium bisulfate preserved vials received from the lab will be taken out in the field, and returned to the laboratory for analysis without being opened. Preservative blanks represent background contamination resulting from the sample container, preservative, and shipment.

The laboratory is responsible for ensuring that the laboratory's data precision and accuracy are maintained in accordance with specifications. Internal laboratory duplicates and calibration checks are performed on 1 of every 20 samples submitted for analysis. Other internal laboratory QA/QC is performed according to laboratory standard operating procedures (SOP).

Data quality objectives for measurements during this project were addressed in terms of precision, accuracy, representativeness, completeness, comparability, and sensitivity. QA/QC activities and data usability assessments were performed to ensure that the collected data was properly documented, met project objectives, and produced reliable data (please see Appendix E).

8.0 HEALTH AND SAFETY

Prior to the start of the field effort, the following activities will be completed. Please refer to Site Specific Health and Safety Plan in Appendix F.

- All site workers will read and agree to follow the site Health and Safety Plan (via written acknowledgment).
- All site workers will be reviewed to ensure that they have had 40 hour OSHA "HAZWOPER" training, and that site supervisory personnel have had OSHA 8 hour supervisory training.
- FGA project personnel have contacted the designated project site representative(s) about starting the project and approval has been obtained.
- The FGA field team leader will have portable voice communication equipment on their possessions (i.e. phone).
- All FGA project personnel will have direct access and possession of an ABC type fire extinguisher and first aid kit.

9.0 REFERENCES

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FIGURES

Figure 1

Site Location Map

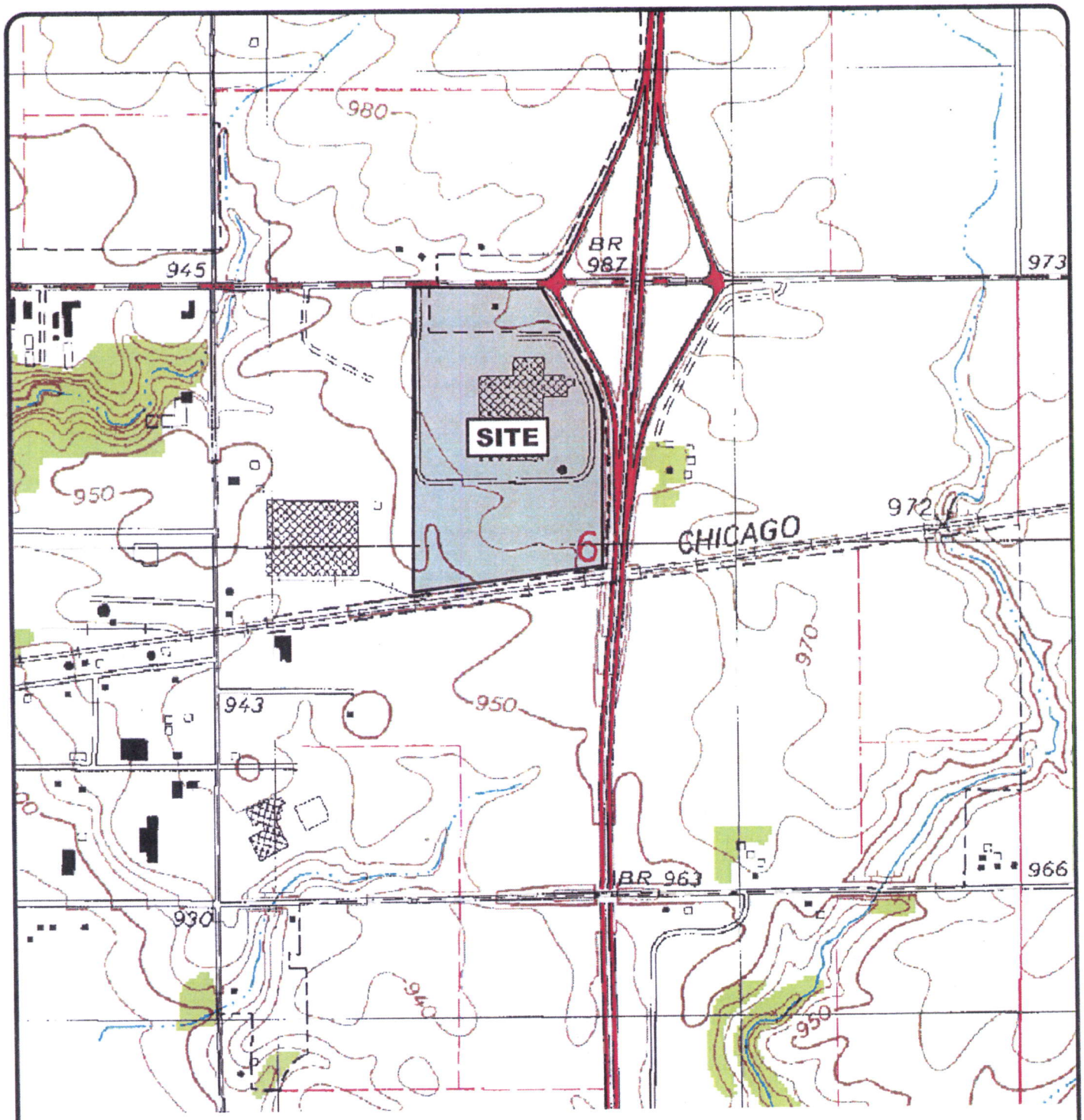

FIGURE 1

SITE LOCATION MAP
SAUER–DANFOSS FACILITY
2800 E. 13th STREET
AMES, IOWA

11/09/10

N
W E
S

0 1000
GRAPHIC SCALE IN FEET

G:\EGLPT\10\10-500\10-500 Base.dwg, Fig1

FEHR-GRAHAM & ASSOCIATES, LLC
ENGINEERING AND SCIENCE CONSULTANTS
FREEPORT, IL ROCKFORD, IL ROCHELLE, IL SPRINGFIELD, IL MONROE, WI
ILLINOIS DESIGN FIRM NO. 184-003525

Figure 2

Site Base Map

FIGURE 2

SITE BASE MAP
SAUER–DANFOSS FACILITY
2800 E. 13th STREET
AMES, IOWA

11/09/10

N
W E
S

0 300

GRAPHIC SCALE IN FEET

G:\EGLPT\10\10-500\10-500 Base.dwg, Fig2

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ENGINEERING AND SCIENCE CONSULTANTS
FREEPORT, IL ROCKFORD, IL ROCHELLE, IL SPRINGFIELD, IL MONROE, WI
ILLINOIS DESIGN FIRM NO. 184-003825

Figure 3

Soil Boring/Monitoring Well Location Map

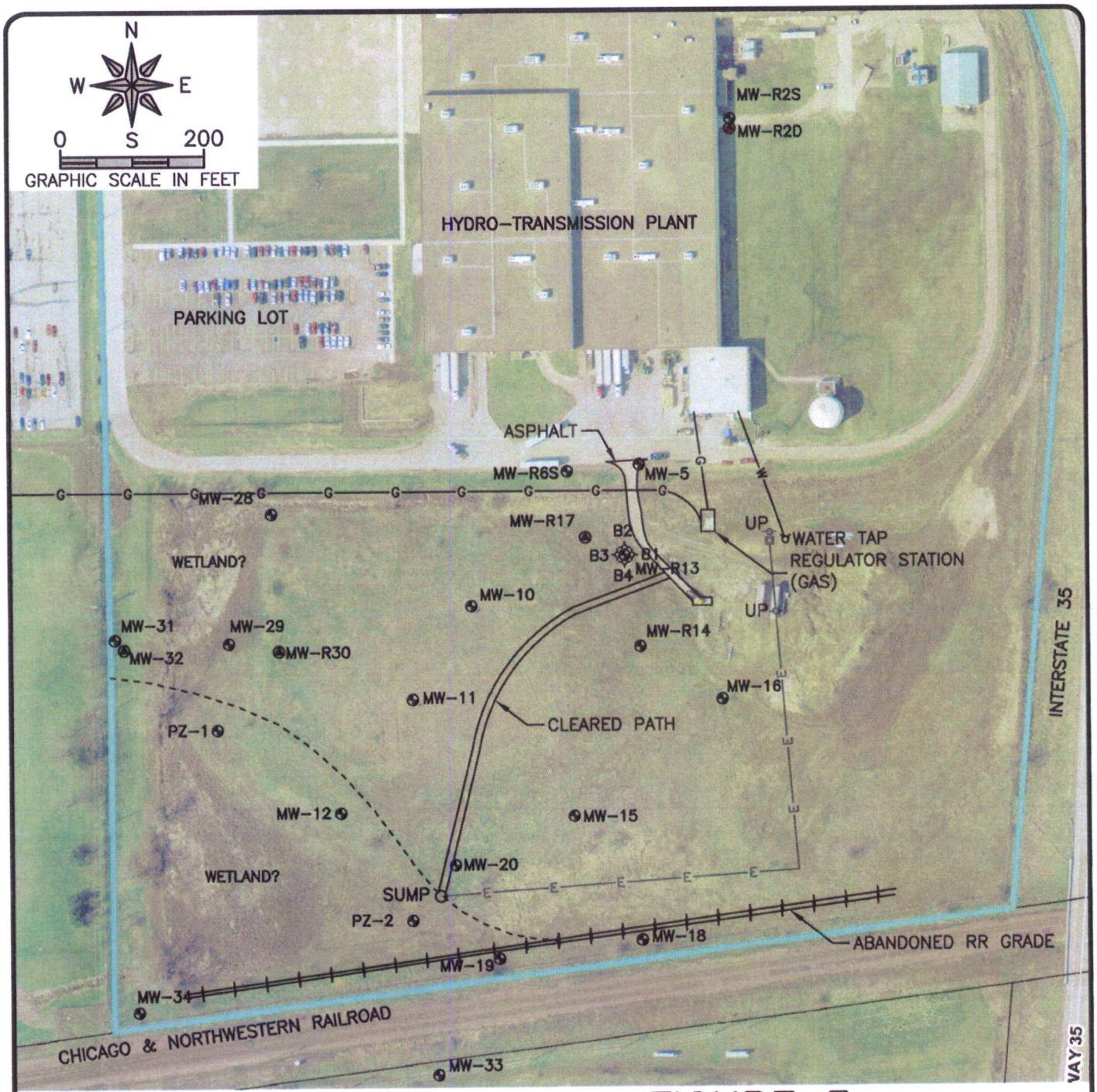

FIGURE 3

SOIL BORING/MONITORING WELL LOCATION MAP
SAUER-DANFOSS FACILITY
2800 E. 13th STREET
AMES, IOWA

11/22/10

LEGEND

- SHALLOW MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING

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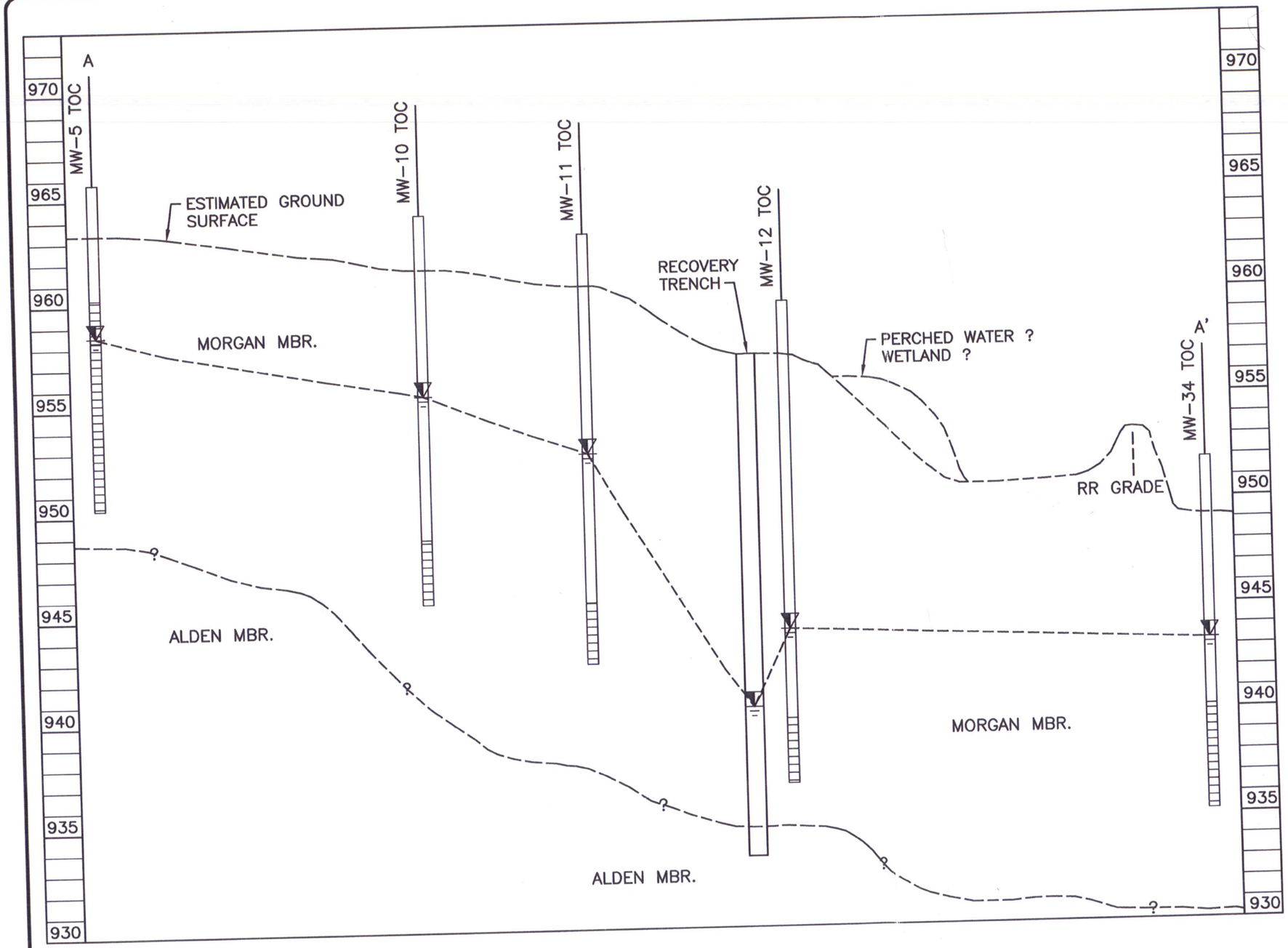
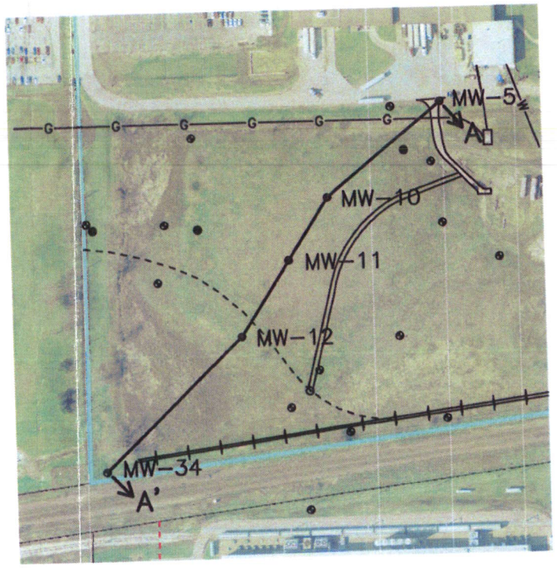
ILLINOIS DESIGN FIRM NO. 184-003528

G:\EGLPT\10\10-500\10-500 Base.dwg, Fig3

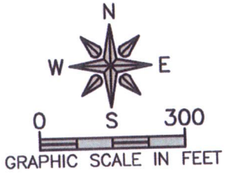
Figure 4

Geologic Cross-Sections





CROSS-SECTION A-A'



WATER ELEVATION DATA COLLECTED 10/20/10

FIGURE 4a

GEOLOGIC CROSS SECTION
SAUER-DANFOSS FACILITY
2800 E. 13th STREET
AMES, IOWA

11/22/10

SCALE:

HORIZ. 1" = 100'

VERT. 1" = 5'

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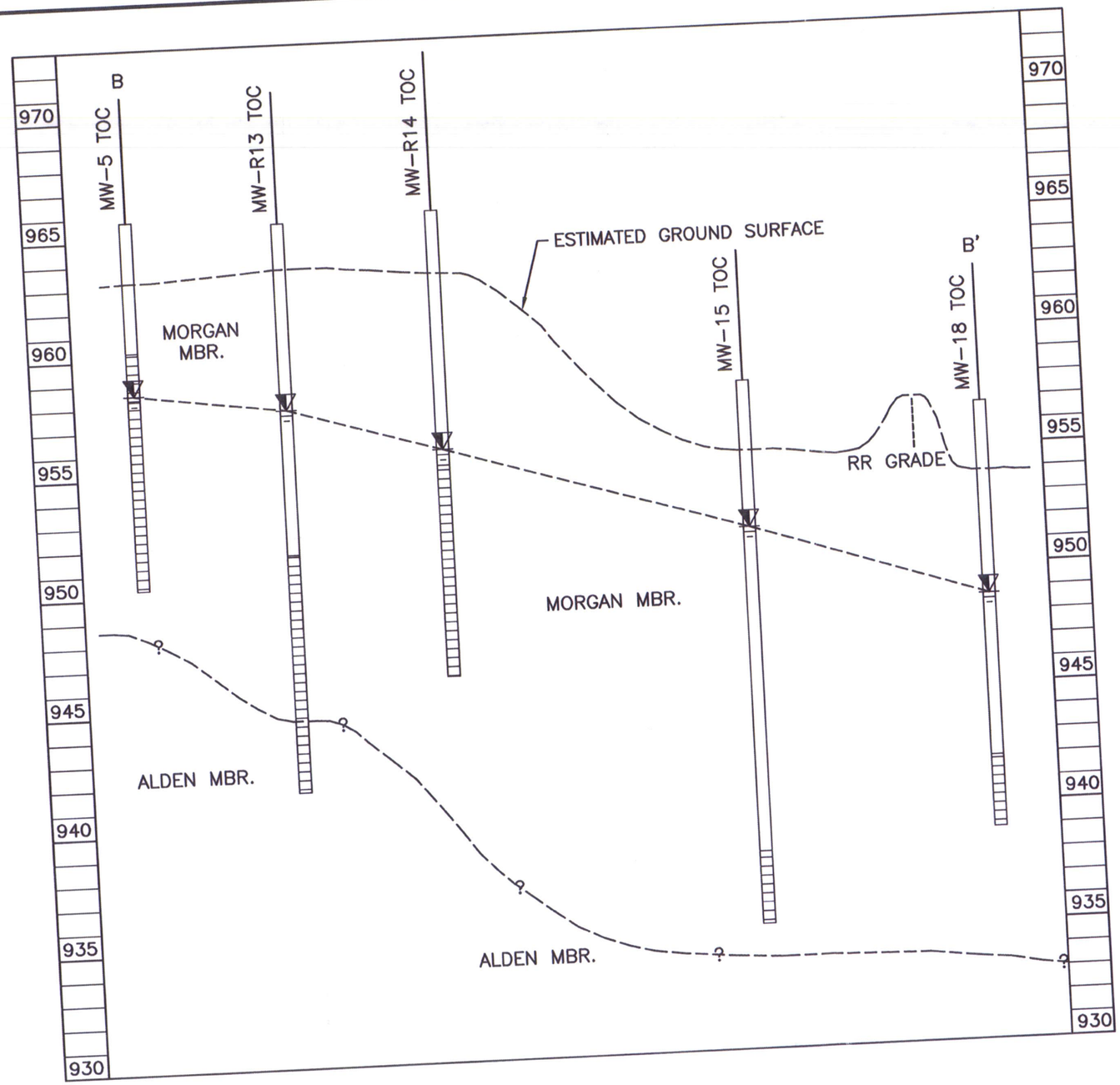
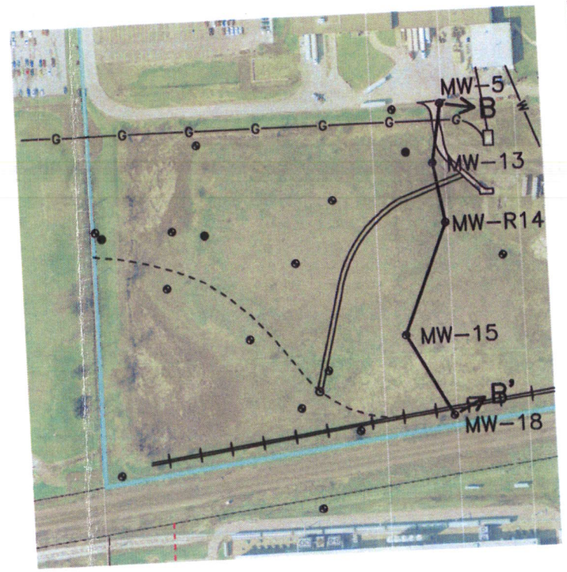
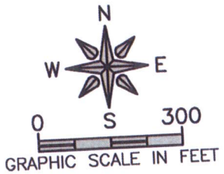
G:\EGLPT\10\10-500\10-500 Base.dwg, Fig4a





CROSS-SECTION B-B'



SCALE:

HORIZ. 1" = 100'

VERT. 1" = 5'

WATER ELEVATION DATA COLLECTED 10/20/10

FIGURE 4b

GEOLOGIC CROSS SECTION
SAUER-DANFOSS FACILITY
2800 E. 13th STREET
AMES, IOWA

11/22/10

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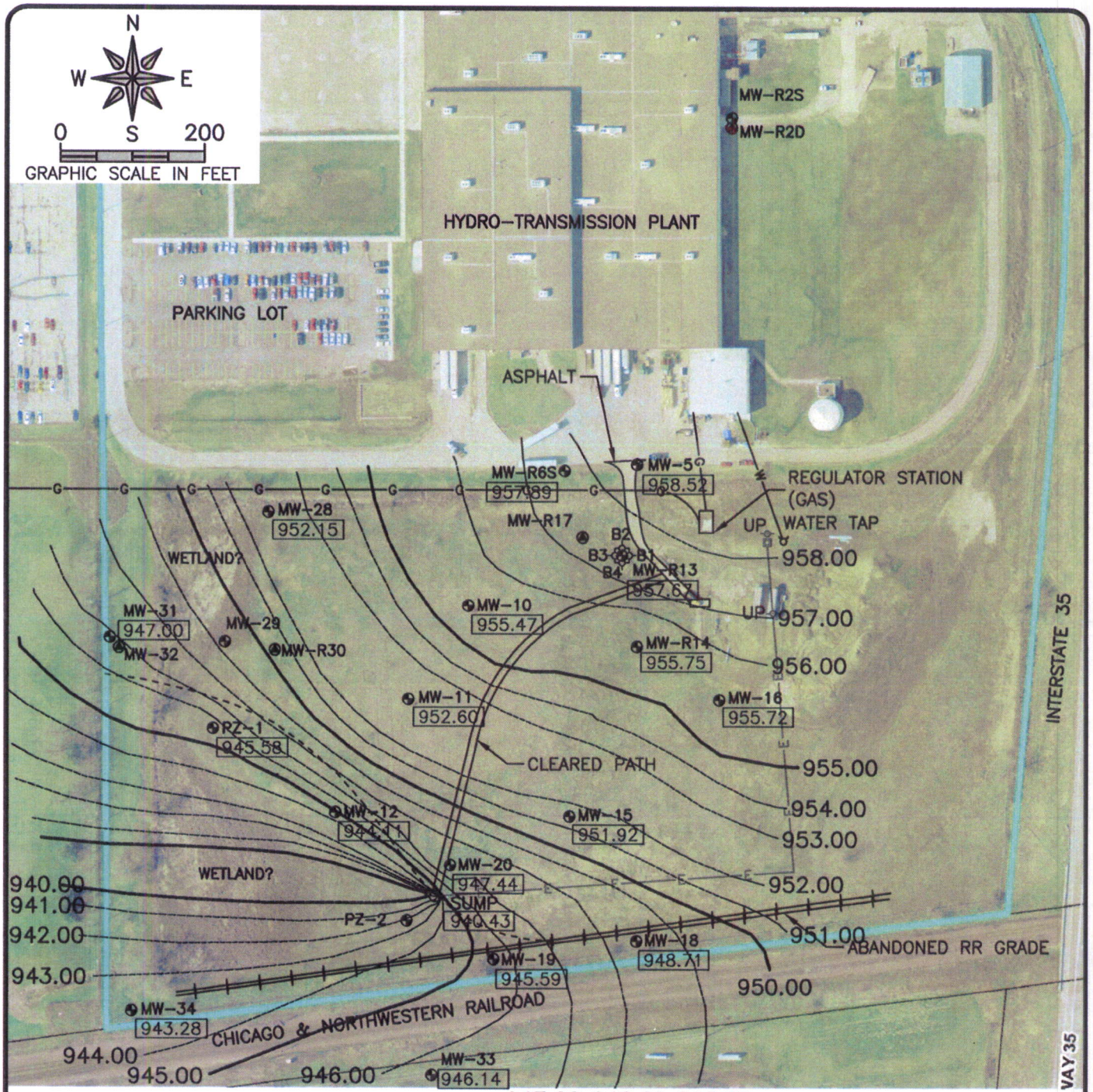
G:\EGLPT\10\10-500\10-500 Base.dwg, Fig4b

Figure 5

Groundwater Flow Map



LEGEND

- SHALLOW MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING

DATA COLLECTED 10/20/10
CONTOUR INTERVAL = 1.00 FT.

FIGURE 5

GROUNDWATER FLOW MAP
SAUER–DANFOSS FACILITY
2800 E. 13th STREET
AMES, IOWA

11/22/10

FEHR-GRAHAM & ASSOCIATES, LLC
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ILLINOIS DESIGN FIRM NO. 184-003525

G:\EGLPT\10\10-500\10-500 Base.dwg, Fig5

Figure 6

Soil Contamination Distribution Map

Analytical Parameter	Qualifier	CTI0218-04 27863 - B-3 @ 6-7 Date Sampled: 09/02/10 10:51 Result (mg/kg)
Acetone	<	0.0453
1,1-Dichloroethane	<	0.00453
1,2-Dichloroethane (Ethylene dichloride)	<	0.00453
1,1-Dichloroethene (Dichloroethylene)	<	0.00453
cis-1,2-Dichloroethene (Dichloroethylene)	M1	**0.0313**
trans-1,2-Dichloroethene (Dichloroethylene)	<	0.00453
1,4-Dioxane		**0.028**
Methylene Chloride (Dichloromethane)	<	0.0453
Tetrachloroethylene (Perchloroethylene)	M1	**0.171**
1,1,1-Trichloroethane	M1	**0.0192**
1,1,2-Trichloroethane	<	0.00453
Trichloroethene (Trichloroethylene)		**0.00512**
Vinyl chloride	<	0.0136
Xylenes (Total)	<	0.0136

Analytical Parameter	Qualifier	CTI0218-04 27863 - B-3 @ 6-7 Date Sampled: 09/02/10 10:51 Result (mg/kg)
Acetone	<	0.0453
1,1-Dichloroethane	<	0.00453
1,2-Dichloroethane (Ethylene dichloride)	<	0.00453
1,1-Dichloroethene (Dichloroethylene)	<	0.00453
cis-1,2-Dichloroethene (Dichloroethylene)	M1	**0.0313**
trans-1,2-Dichloroethene (Dichloroethylene)	<	0.00453
1,4-Dioxane		**0.028**
Methylene Chloride (Dichloromethane)	<	0.0453
Tetrachloroethylene (Perchloroethylene)	M1	**0.171**
1,1,1-Trichloroethane	M1	**0.0192**
1,1,2-Trichloroethane	<	0.00453
Trichloroethene (Trichloroethylene)		**0.00512**
Vinyl chloride	<	0.0136
Xylenes (Total)	<	0.0136

Analytical Parameter	Qualifier	CTI0218-05 27864 - B-3 @ 6-7 (DUP) Date Sampled: 09/02/10 10:51 Result (mg/kg)
Acetone	<	0.0424
1,1-Dichloroethane	<	0.00424
1,2-Dichloroethane (Ethylene dichloride)	<	0.00424
1,1-Dichloroethene (Dichloroethylene)		**0.00457**
cis-1,2-Dichloroethene (Dichloroethylene)		**0.0205**
trans-1,2-Dichloroethene (Dichloroethylene)	<	0.00424
1,4-Dioxane		—[a]
Methylene Chloride (Dichloromethane)	<	0.0424
Tetrachloroethylene (Perchloroethylene)		**0.170**
1,1,1-Trichloroethane		**0.0237**
1,1,2-Trichloroethane	<	0.00424
Trichloroethene (Trichloroethylene)	<	0.00424
Vinyl chloride	<	0.0127
Xylenes (Total)	<	0.0127

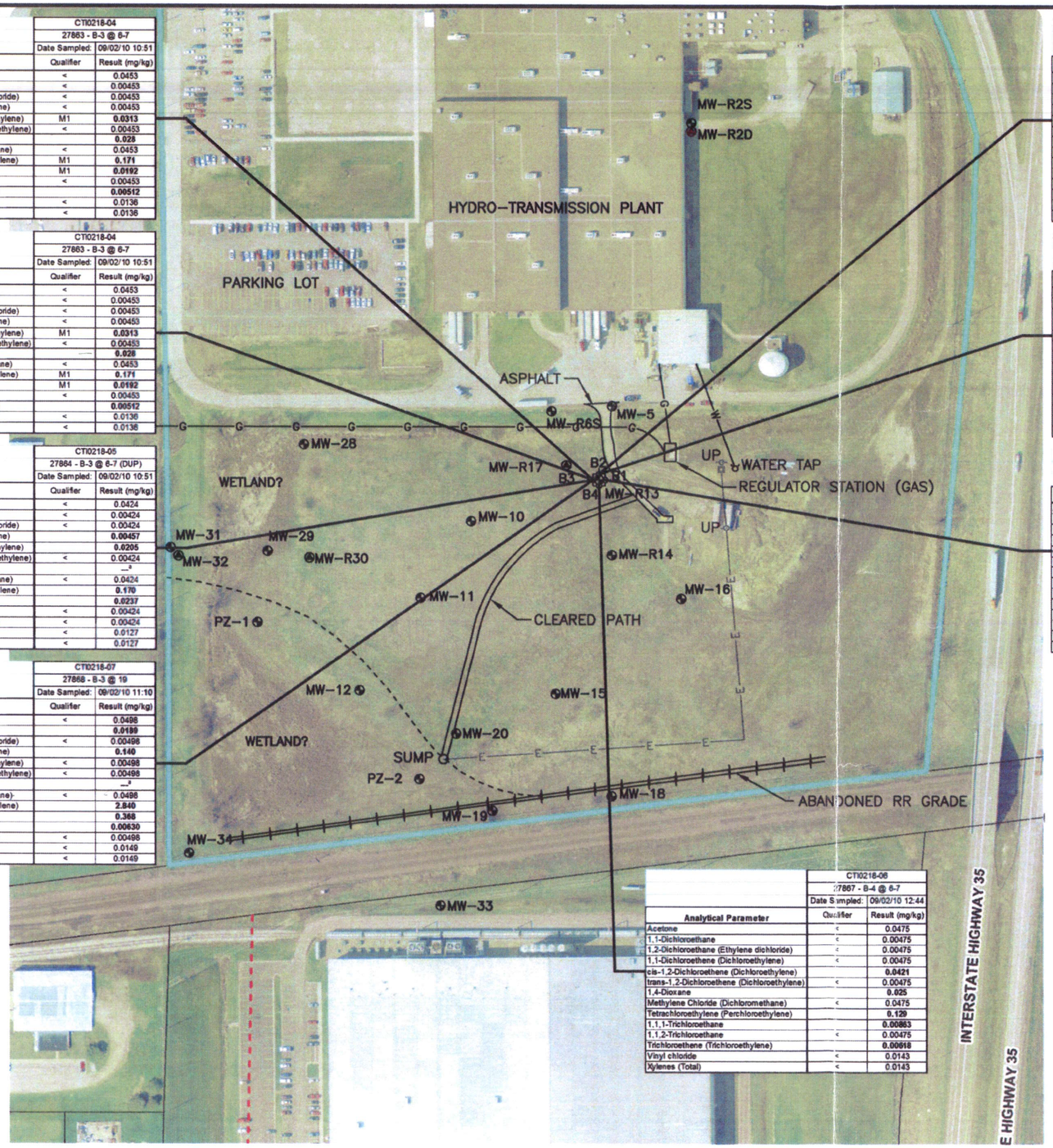
Analytical Parameter	Qualifier	CTI0218-07 27868 - B-3 @ 19 Date Sampled: 09/02/10 11:10 Result (mg/kg)
Acetone	<	**0.0498**
1,1-Dichloroethane		**0.0189**
1,2-Dichloroethane (Ethylene dichloride)	<	0.00498
1,1-Dichloroethene (Dichloroethylene)		**0.140**
cis-1,2-Dichloroethene (Dichloroethylene)	<	0.00498
trans-1,2-Dichloroethene (Dichloroethylene)	<	0.00498
1,4-Dioxane		—[a]
Methylene Chloride (Dichloromethane)	<	0.0498
Tetrachloroethylene (Perchloroethylene)		**2.840**
1,1,1-Trichloroethane		**0.368**
1,1,2-Trichloroethane		**0.00630**
Trichloroethene (Trichloroethylene)	<	0.00498
Vinyl chloride	<	0.0149
Xylenes (Total)	<	0.0149

Analytical Parameter	Qualifier	CTI0218-06 27867 - B-4 @ 6-7 Date Sampled: 09/02/10 12:44 Result (mg/kg)
Acetone	<	0.0475
1,1-Dichloroethane	<	0.00475
1,2-Dichloroethane (Ethylene dichloride)	<	0.00475
1,1-Dichloroethene (Dichloroethylene)	<	0.00475
cis-1,2-Dichloroethene (Dichloroethylene)		**0.0421**
trans-1,2-Dichloroethene (Dichloroethylene)	<	0.00475
1,4-Dioxane		**0.025**
Methylene Chloride (Dichloromethane)	<	0.0475
Tetrachloroethylene (Perchloroethylene)		**0.129**
1,1,1-Trichloroethane		**0.00863**
1,1,2-Trichloroethane	<	0.00475
Trichloroethene (Trichloroethylene)		**0.00618**
Vinyl chloride	<	0.0143
Xylenes (Total)	<	0.0143

Analytical Parameter	Qualifier	CTI0218-02 27861 - B-2 @ 6-7 Date Sampled: 09/02/10 09:58 Result (mg/kg)
Acetone	<	0.049
1,1-Dichloroethane	<	0.0049
1,2-Dichloroethane (Ethylene dichloride)	<	0.0049
1,1-Dichloroethene (Dichloroethylene)	<	0.0049
cis-1,2-Dichloroethene (Dichloroethylene)		**0.0584**
trans-1,2-Dichloroethene (Dichloroethylene)	<	0.0049
1,4-Dioxane		**0.210**
Methylene Chloride (Dichloromethane)	<	0.049
Tetrachloroethylene (Perchloroethylene)		**0.266**
1,1,1-Trichloroethane		**0.0155**
1,1,2-Trichloroethane	<	0.0049
Trichloroethene (Trichloroethylene)		**0.00672**
Vinyl chloride	<	0.0147
Xylenes (Total)	<	0.0147

Analytical Parameter	Qualifier	CTI0218-03 27862 - B-2 @ 19-20 Date Sampled: 09/02/10 10:20 Result (mg/kg)
Acetone	<	0.0423
1,1-Dichloroethane		**0.243**
1,2-Dichloroethane (Ethylene dichloride)	<	0.00423
1,1-Dichloroethene (Dichloroethylene)		**0.394**
cis-1,2-Dichloroethene (Dichloroethylene)	<	0.00423
trans-1,2-Dichloroethene (Dichloroethylene)	<	0.00423
1,4-Dioxane		—[a]
Methylene Chloride (Dichloromethane)	<	0.0423
Tetrachloroethylene (Perchloroethylene)		**0.0289**
1,1,1-Trichloroethane		**1.600**
1,1,2-Trichloroethane	<	**0.0359**
Trichloroethene (Trichloroethylene)	<	0.0423
Vinyl chloride	<	0.0127
Xylenes (Total)	<	0.0127

Analytical Parameter	Qualifier	CTI0218-01 27860 - B-1 @ 6-7 Date Sampled: 09/02/10 09:08 Result (mg/kg)
Acetone	<	0.0519
1,1-Dichloroethane	<	0.00519
1,2-Dichloroethane (Ethylene dichloride)	<	0.00519
1,1-Dichloroethene (Dichloroethylene)	<	0.00519
cis-1,2-Dichloroethene (Dichloroethylene)		**0.0294**
trans-1,2-Dichloroethene (Dichloroethylene)	<	0.00519
1,4-Dioxane		**0.053**
Methylene Chloride (Dichloromethane)	<	0.0519
Tetrachloroethylene (Perchloroethylene)		**0.0990**
1,1,1-Trichloroethane	<	0.00519
1,1,2-Trichloroethane	<	0.00519
Trichloroethene (Trichloroethylene)	<	0.00519
Vinyl chloride	<	0.0156
Xylenes (Total)	<	0.0156



LEGEND

- SHALLOW MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING

N W E

0 S 200

GRAPHIC SCALE IN FEET

FIGURE 6

SOIL CONTAMINATION DISTRIBUTION MAP SAUER-DANFOSS FACILITY 2800 E. 13th STREET AMES, IOWA

11/22/10

FEHR-GRAHAM & ASSOCIATES, LLC
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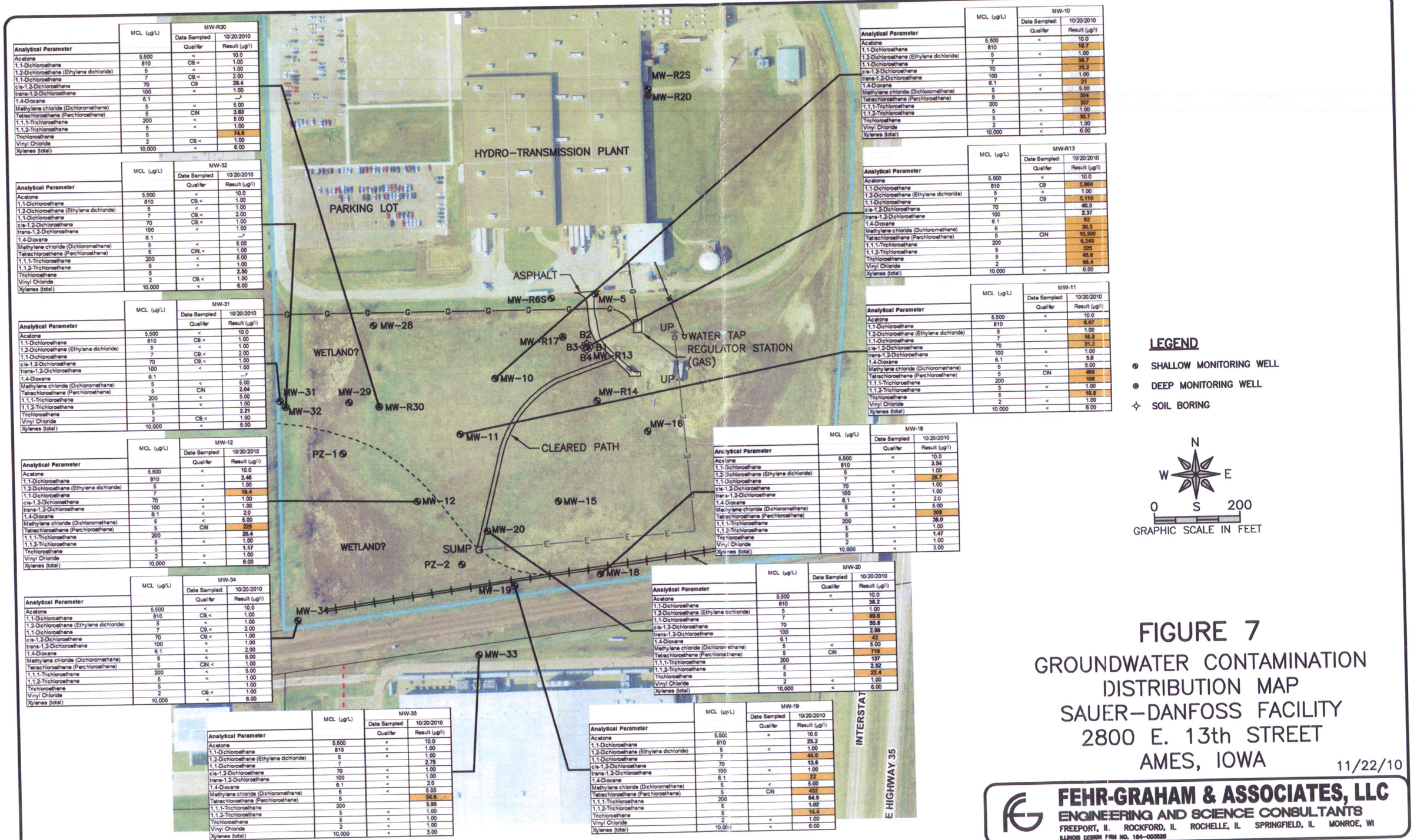
G:\EGLPT\10\10-500\10-500 Base.dwg, Fig6

Figure 7

Groundwater Contamination Distribution Map



Analytical Parameter	MCL (µg/L)	MW-30 Date Sampled:	10/20/2010
		Qualifier	Result (µg/l)
Acetone	5,500	<	10.0
1,1-Dichloroethane	810	C9,<	1.00
1,2-Dichloroethane (Ethylene dichloride)	5	<	1.00
1,1-Dichloroethene	7	C9,<	2.00
cis-1,2-Dichloroethene	70	C9	29.4
trans-1,2-Dichloroethene	100	<	1.00
1,4-Dioxane	6.1		--*
Methylene chloride (Dichloromethane)	5	<	5.00
Tetrachloroethene (Perchloroethene)	5	CIN	3.83
1,1,1-Trichloroethane	200	<	5.00
1,1,2-Trichloroethane	5	<	1.00
Trichloroethene	5		74.8
Vinyl Chloride	2	C9,<	1.00
Xylenes (total)	10,000	<	6.00

Analytical Parameter	MCL (µg/L)	MW-32 Date Sampled:	10/20/2010
		Qualifier	Result (µg/l)
Acetone	5,500	<	10.0
1,1-Dichloroethane	810	C9,<	1.00
1,2-Dichloroethane (Ethylene dichloride)	5	<	1.00
1,1-Dichloroethene	7	C9,<	2.00
cis-1,2-Dichloroethene	70	C9,<	1.00
trans-1,2-Dichloroethene	100	<	1.00
1,4-Dioxane	6.1		--*
Methylene chloride (Dichloromethane)	5	<	5.00
Tetrachloroethene (Perchloroethene)	5	CIN,<	1.00
1,1,1-Trichloroethane	200	<	5.00
1,1,2-Trichloroethane	5	<	1.00
Trichloroethene	5		2.50
Vinyl Chloride	2	C9,<	1.00
Xylenes (total)	10,000	<	6.00

Analytical Parameter	MCL (µg/L)	MW-31 Date Sampled:	10/20/2010
		Qualifier	Result (µg/l)
Acetone	5,500	<	10.0
1,1-Dichloroethane	810	C9,<	1.00
1,2-Dichloroethane (Ethylene dichloride)	5	<	1.00
1,1-Dichloroethene	7	C9,<	2.00
cis-1,2-Dichloroethene	70	C9,<	1.00
trans-1,2-Dichloroethene	100	<	1.00
1,4-Dioxane	6.1		--*
Methylene chloride (Dichloromethane)	5	<	5.00
Tetrachloroethene (Perchloroethene)	5	CIN	2.04
1,1,1-Trichloroethane	200	<	5.00
1,1,2-Trichloroethane	5	<	1.00
Trichloroethene	5		2.21
Vinyl Chloride	2	C9,<	1.00
Xylenes (total)	10,000	<	6.00

Analytical Parameter	MCL (µg/L)	MW-12 Date Sampled:	10/20/2010
		Qualifier	Result (µg/l)
Acetone	5,500	<	10.0
1,1-Dichloroethane	810		2.46
1,2-Dichloroethane (Ethylene dichloride)	5	<	1.00
1,1-Dichloroethene	7		19.4
cis-1,2-Dichloroethene	70	<	1.00
trans-1,2-Dichloroethene	100	<	1.00
1,4-Dioxane	6.1	<	2.0
Methylene chloride (Dichloromethane)	5	<	5.00
Tetrachloroethene (Perchloroethene)	5	CIN	225
1,1,1-Trichloroethane	200		20.4
1,1,2-Trichloroethane	5	<	1.00
Trichloroethene	5		1.17
Vinyl Chloride	2	<	1.00
Xylenes (total)	10,000	<	6.00

Analytical Parameter	MCL (µg/L)	MW-34 Date Sampled:	10/20/2010
		Qualifier	Result (µg/l)
Acetone	5,500	<	10.0
1,1-Dichloroethane	810	C9,<	1.00
1,2-Dichloroethane (Ethylene dichloride)	5	<	1.00
1,1-Dichloroethene	7	C9,<	2.00
cis-1,2-Dichloroethene	70	C9,<	1.00
trans-1,2-Dichloroethene	100	<	1.00
1,4-Dioxane	6.1	<	2.00
Methylene chloride (Dichloromethane)	5	<	5.00
Tetrachloroethene (Perchloroethene)	5	CIN,<	1.00
1,1,1-Trichloroethane	200	<	5.00
1,1,2-Trichloroethane	5	<	1.00
Trichloroethene	5		1.00
Vinyl Chloride	2	C9,<	1.00
Xylenes (total)	10,000	<	6.00

Analytical Parameter	MCL (µg/L)	MW-33 Date Sampled:	10/20/2010
		Qualifier	Result (µg/l)
Acetone	5,500	<	10.0
1,1-Dichloroethane	810	<	1.00
1,2-Dichloroethane (Ethylene dichloride)	5	<	1.00
1,1-Dichloroethene	7		2.75
cis-1,2-Dichloroethene	70	<	1.00
trans-1,2-Dichloroethene	100	<	1.00
1,4-Dioxane	6.1	<	2.0
Methylene chloride (Dichloromethane)	5	<	5.00
Tetrachloroethene (Perchloroethene)	5		54.6
1,1,1-Trichloroethane	200		3.95
1,1,2-Trichloroethane	5	<	1.00
Trichloroethene	5	<	1.00
Vinyl Chloride	2	<	1.00
Xylenes (total)	10,000	<	3.00

Analytical Parameter	MCL (µg/L)	MW-10 Date Sampled:	10/20/2010
		Qualifier	Result (µg/l)
Acetone	5,500	<	10.0
1,1-Dichloroethane	810		18.7
1,2-Dichloroethane (Ethylene dichloride)	5	<	1.00
1,1-Dichloroethene	7		56.7
cis-1,2-Dichloroethene	70		25.2
trans-1,2-Dichloroethene	100	<	1.00
1,4-Dioxane	6.1		21
Methylene chloride (Dichloromethane)	5	<	5.00
Tetrachloroethene (Perchloroethene)	5		504
1,1,1-Trichloroethane	200		307
1,1,2-Trichloroethane	5	<	1.00
Trichloroethene	5		30.7
Vinyl Chloride	2	<	1.00
Xylenes (total)	10,000	<	6.00

Analytical Parameter	MCL (µg/L)	MW-R13 Date Sampled:	10/20/2010
		Qualifier	Result (µg/l)
Acetone	5,500	<	10.0
1,1-Dichloroethane	810	C9	2,860
1,2-Dichloroethane (Ethylene dichloride)	5	<	1.00
1,1-Dichloroethene	7	C9	5,110
cis-1,2-Dichloroethene	70		40.5
trans-1,2-Dichloroethene	100		2.37
1,4-Dioxane	6.1		62
Methylene chloride (Dichloromethane)	5		30.5
Tetrachloroethene (Perchloroethene)	5	CIN	10,300
1,1,1-Trichloroethane	200		6,340
1,1,2-Trichloroethane	5		325
Trichloroethene	5		45.8
Vinyl Chloride	2		66.4
Xylenes (total)	10,000	<	6.00

Analytical Parameter	MCL (µg/L)	MW-11 Date Sampled:	10/20/2010
		Qualifier	Result (µg/l)
Acetone	5,500	<	10.0
1,1-Dichloroethane	810		6.67
1,2-Dichloroethane (Ethylene dichloride)	5	<	1.00
1,1-Dichloroethene	7		16.8
cis-1,2-Dichloroethene	70		31.2
trans-1,2-Dichloroethene	100	<	1.00
1,4-Dioxane	6.1		5.8
Methylene chloride (Dichloromethane)	5	<	5.00
Tetrachloroethene (Perchloroethene)	5	CIN	469
1,1,1-Trichloroethane	200		106
1,1,2-Trichloroethane	5	<	1.00
Trichloroethene	5		19.8
Vinyl Chloride	2	<	1.00
Xylenes (total)	10,000	<	6.00

Analytical Parameter	MCL (µg/L)	MW-18 Date Sampled:	10/20/2010
		Qualifier	Result (µg/l)
Acetone	5,500	<	10.0
1,1-Dichloroethane	810		3.54
1,2-Dichloroethane (Ethylene dichloride)	5	<	1.00
1,1-Dichloroethene	7		29.7
cis-1,2-Dichloroethene	70	<	1.00
trans-1,2-Dichloroethene	100	<	1.00
1,4-Dioxane	6.1	<	2.0
Methylene chloride (Dichloromethane)	5	<	5.00
Tetrachloroethene (Perchloroethene)	5		309
1,1,1-Trichloroethane	200		38.0
1,1,2-Trichloroethane	5	<	1.00
Trichloroethene	5		1.47
Vinyl Chloride	2	<	1.00
Xylenes (total)	10,000	<	3.00

Analytical Parameter	MCL (µg/L)	MW-20 Date Sampled:	10/20/2010
		Qualifier	Result (µg/l)
Acetone	5,500	<	10.0
1,1-Dichloroethane	810		38.2
1,2-Dichloroethane (Ethylene dichloride)	5	<	1.00
1,1-Dichloroethene	7		88.6
cis-1,2-Dichloroethene	70		55.8
trans-1,2-Dichloroethene	100		2.98
1,4-Dioxane	6.1		42
Methylene chloride (Dichloromethane)	5	<	5.00
Tetrachloroethene (Perchloroethene)	5	CIN	719
1,1,1-Trichloroethane	200		137
1,1,2-Trichloroethane	5		2.52
Trichloroethene	5		22.4
Vinyl Chloride	2	<	1.00
Xylenes (total)	10,000	<	6.00

Analytical Parameter	MCL (µg/L)	MW-19 Date Sampled:	10/20/2010
		Qualifier	Result (µg/l)
Acetone	5,500	<	10.0
1,1-Dichloroethane	810		25.2
1,2-Dichloroethane (Ethylene dichloride)	5	<	1.00
1,1-Dichloroethene	7		46.0
cis-1,2-Dichloroethene	70		13.6
trans-1,2-Dichloroethene	100	<	1.00
1,4-Dioxane	6.1		22
Methylene chloride (Dichloromethene)	5	<	5.00
Tetrachloroethene (Perchloroethene)	5	CIN	432
1,1,1-Trichloroethane	200		64.9
1,1,2-Trichloroethane	5		1.02
Trichloroethene	5		14.4
Vinyl Chloride	2	<	1.00
Xylenes (total)	10,000	<	6.00

LEGEND

- SHALLOW MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING

N W E S

0 200

GRAPHIC SCALE IN FEET

FIGURE 7

GROUNDWATER CONTAMINATION DISTRIBUTION MAP SAUER-DANFOSS FACILITY 2800 E. 13th STREET AMES, IOWA

11/22/10

FEHR-GRAHAM & ASSOCIATES, LLC
ENGINEERING AND SCIENCE CONSULTANTS
FREEPORT, IL ROCKFORD, IL ROCHELLE, IL SPRINGFIELD, IL MONROE, WI
ILLINOIS DESIGN FIRM NO. 184-003525

G:\EGLPT\10\10-500\10-500 Base.dwg, Fig7

Figure 8

Proposed Na-Persulfate Injection Area Map

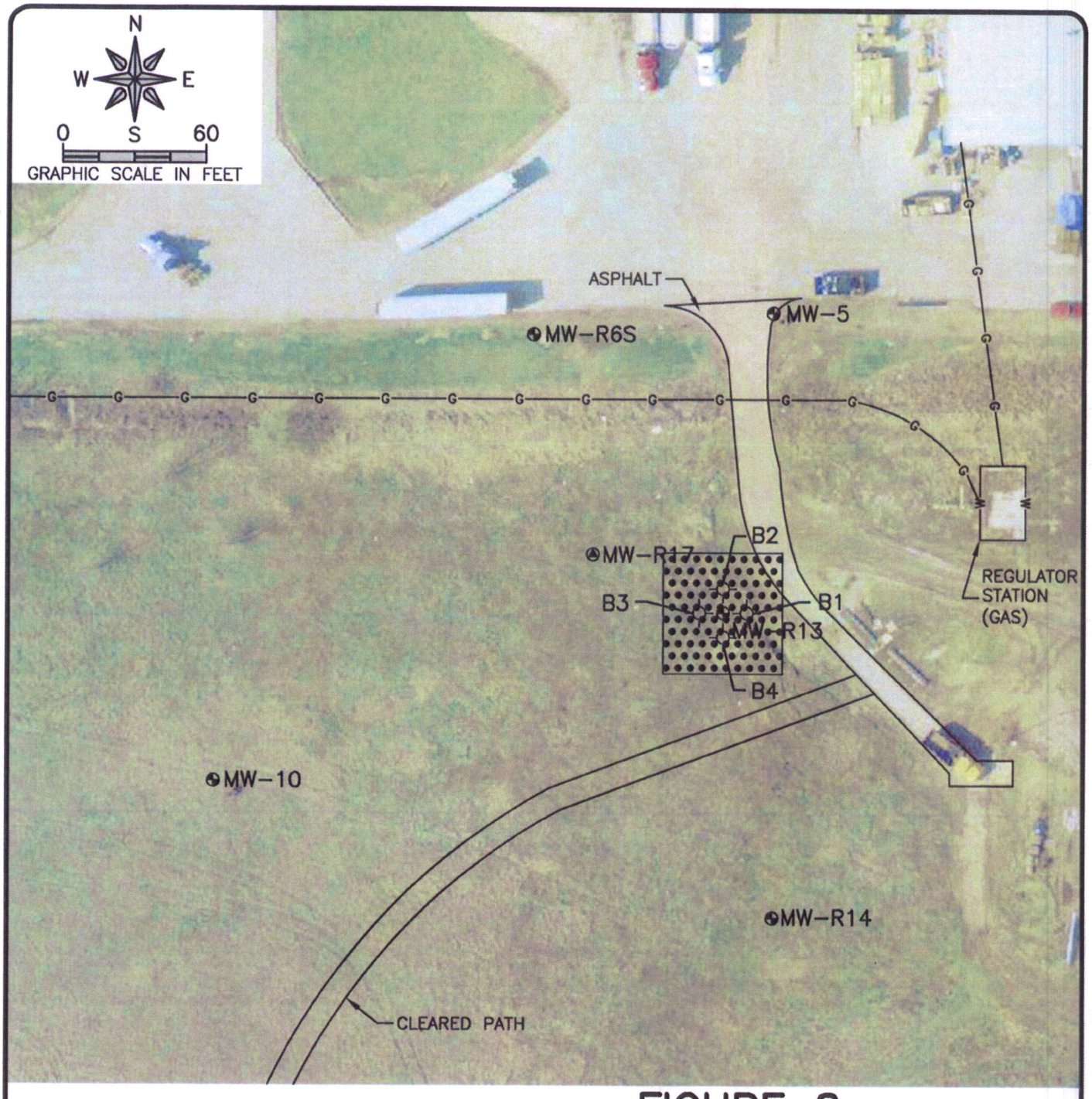


FIGURE 8

PROPOSED Na-Persulfate INJECTION AREA MAP SAUER-DANFOSS FACILITY 2800 E. 13th STREET AMES, IOWA

11/22/10

LEGEND

- SHALLOW MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING
- PROPOSED ISCO INJECTION POINTS

FEHR-GRAHAM & ASSOCIATES, LLC
ENGINEERING AND SCIENCE CONSULTANTS
FREEPORT, IL ROCKFORD, IL ROCHELLE, IL SPRINGFIELD, IL MONROE, WI
ILLINOIS DESIGN FIRM NO. 184-003525

G:\EGLPT\10\10-500\10-500 Base.dwg, Fig8

TABLES

Table 1

Soil Analytical Results

- Table 1A – Volatile Organic Compounds
- Table 1B – Inorganics and pH

Table 1A – Volatile Organic Compounds

Table 1A
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Soil Sample Results
Volatile Organic Compounds

		CTI0218-01		CIT0218-02		CIT0218-03		CTI0218-04		CTI0218-05		CTI0218-07		CTI0218-06	
		27860 - B-1 @ 6-7		27861 - B-2 @ 6-7		27862 - B-2 @ 19-20		27863 - B-3 @ 6-7		27864 - B-3 @ 6-7 (DUP)		27868 - B-3 @ 19		27867 - B-4 @ 6-7	
		Date Sampled:	09/02/10 09:08	Date Sampled:	09/02/10 09:58	Date Sampled:	09/02/10 10:20	Date Sampled:	09/02/10 10:51	Date Sampled:	09/02/10 10:51	Date Sampled:	09/02/10 11:10	Date Sampled:	09/02/10 12:44
	Analytical Parameter	Qualifier	Result (mg/kg)	Qualifier	Result (mg/kg)	Qualifier	Result (mg/kg)	Qualifier	Result (mg/kg)	Qualifier	Result (mg/kg)	Qualifier	Result (mg/kg)	Qualifier	Result (mg/kg)
VOLATILE ORGANIC COMPOUNDS	Acetone	<	0.0519	<	0.049	<	0.0423	<	0.0453	<	0.0424	<	0.0498	<	0.0475
	1,1-Dichloroethane	<	0.00519	<	0.0049		**0.243**	<	0.00453	<	0.00424		**0.0189**	<	0.00475
	1,2-Dichloroethane (Ethylene dichloride)	<	0.00519	<	0.0049	<	0.00423	<	0.00453	<	0.00424	<	0.00498	<	0.00475
	1,1-Dichloroethene (Dichloroethylene)	<	0.00519	<	0.0049		**0.394**	<	0.00453		**0.00457**		**0.140**	<	0.00475
	cis-1,2-Dichloroethene(Dichloroethylene)		**0.0294**		**0.0584**	<	0.00423	M1	**0.0313**		**0.0205**	<	0.00498		**0.0421**
	trans-1,2-Dichloroethene(Dichloroethylene)	<	0.00519	<	0.0049	<	0.00423	<	0.00453	<	0.00424	<	0.00498	<	0.00475
	1,4-Dioxane		**0.053**		**0.210**		—[a]		**0.028**		—[a]		—[a]		**0.025**
	Methylene Chloride (Dichloromethane)	<	0.0519	<	0.049	<	0.0423	<	0.0453	<	0.0424	<	0.0498	<	0.0475
	Tetrachloroethylene (Perchloroethylene)		**0.0990**		**0.266**		**0.0289**	M1	**0.171**		**0.170**		**2.840**		**0.129**
	1,1,1-Trichloroethane	<	0.00519		**0.0155**		**1.600**	M1	**0.0192**		**0.0237**		**0.368**		**0.00863**
	1,1,2-Trichloroethane	<	0.00519	<	0.0049	<	**0.0359**	<	0.00453	<	0.00424		**0.00630**	<	0.00475
	Trichloroethene (Trichloroethylene)	<	0.00519		**0.00672**	<	0.0423		**0.00512**	<	0.00424	<	0.00498		**0.00618**
	Vinyl chloride	<	0.0156	<	0.0147	<	0.0127	<	0.0136	<	0.0127	<	0.0149	<	0.0143
	Xylenes (Total)	<	0.0156	<	0.0147	<	0.0127	<	0.0136	<	0.0127	<	0.0149	<	0.0143

Bold Font Indicates Detected Parameter

—[a] Parameter not analyzed
< or U Not detected at the Test America Reporting Limit
M1 The MS and/or MSD were outside control limits.

Table 1B – Inorganics and pH

Table 1B
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Soil Sample Results
Inorganics and pH

		CTI0218-01		CTI0218-02		CTI0218-06	
		27860 - B-1 @ 6-7		27861 - B-2 @ 6-7		27867 - B-4 @ 6-7	
		Date Sampled:	09/02/10 09:08	Date Sampled:	09/02/10 09:58	Date Sampled:	09/02/10 12:44
	Analytical Parameter	Qualifier	Result (mg/kg)	Qualifier	Result (mg/kg)	Qualifier	Result (mg/kg)
Inorganics	Arsenic		**5.47**		**8.89**		**6.61**
	Barium		**64.3**		**134**		**53.2**
	Cadmium	<	1.17	<	1.21	<	1.15
	Chromium (total)		**17.3**		**20.1**		**13.8**
	Chromium (Hexavalent)	<	3.52	<	3.12	<	3.44
	Copper		**11.2**		**15.2**		**11.8**
	Iron		**15,600**		**17,600**		**12,800**
	Lead		**7.01**		**6.93**		**9.81**
	Mercury		**0.0251**		**0.0324**	<	0.0229
	Selenium	<	8.80	<	9.04	<	8.59
	Silver	<	1.17	<	1.21	<	1.15
	pH	H3	**7.60**	H3	**7.50**	H3	**8.40**

Bold Font Indicates Detected Parameter

H3 The holding time for this analyte exceed method specifications (Analyze Immediately)

< or U Not detected at the Test America Reporting Limit

Table 2

Groundwater Analytical Results

Table 2
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Groundwater Sample Results
Volatile Organic Compound MCL Limits

		MCL (µg/L)	MW-10		MW-10		MW-10		MW-10		MW-10		MW-10		MW-10		MW-10		MW-10	
			Date Sampled:	Sep-Oct 1994[c]	Date Sampled:	11/21/1997	Date Sampled:	10/20/1999	Date Sampled:	11/06/2001	Date Sampled:	10/22/2002	Date Sampled:	11/10/2004	Date Sampled:	11/15/2006	Date Sampled:	11/15/2006	Date Sampled:	10/30/2008
	Analytical Parameter		Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)
Volatile Organic Compounds	Acetone	5,500	<	25	<	20	<	20	<	20	<	20	<	20	<	10	<	10	<	10
	1,1-Dichloroethane	810		**9.6**[d]		**16.4**		**11.3**		**10.5**		**11.6**		**14.7**		**10**		**10.8**		**13.6**
	1,2-Dichloroethane (Ethylene dichloride)	5	<	5.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,1-Dichloroethene	7		**54**		**35.7**		**28.5**		**22**		**23.7**		**37.6**		**25.3**		**23.9**		**35.6**
	cis-1,2-Dichloroethene	70		**110**		**135**		**87.7**		**104**		**61.1**		**49.6**		**53.3**		**49.7**		**32.6**
	trans-1,2-Dichloroethene	100	<	5.0		**1.6**	<	1.0	<	1.0		**1.7**	<	1.0		**1.07**		**1**	<	1.0
	1,4-Dioxane	6.1		---[a]		---[a]		---[a]		---[a]		---[a]		**12.4**		**11**		**14**		**12**
	Methylene chloride (Dichloromethane)	5	<	5.0	<	10	<	10	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0
	Tetrachloroethene (Perchloroethene)	5		**1,800**		**766**		**456**		**424**		**497**		**625**		**385**		**372**		**405**
	1,1,1-Trichloroethane	200		**410**		**162**		**118**		**120**		**174**	<	**223**		**90.1**		**89.7**		**188**
	1,1,2-Trichloroethane	5	<	5.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	Trichloroethene	5		**28**		**54.5**		**40.4**		**53.2**		**59.8**		**42.9**		**32.3**		**31.7**		**30.9**
	Vinyl Chloride	2		---[a]		---[a]		---[a]		---[a]	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	Xylenes (total)	10,000	<	5.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0

Bold Font Indicates Detected Parameter

---[a]	Parameter not analyzed
< or U	Not detected at Reporting Limit
CIN	The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C.
C9	Calibration Verification recovery was outside the method control limits for this analyte. The LCS for this analyte met CCV acceptance criteria, and was used to validate the batch.

RL for parameter is greater than MCL
Detected parameter exceeds MCL

Table 2
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Groundwater Sample Results
Volatile Organic Compound MCL Limits

	Analytical Parameter	MCL (µg/L)	MW-10		MW-10		MW-11		MW-11		MW-11		MW-11		MW-11		MW-11		MW-11	
			Date Sampled:	10/30/2008	Date Sampled:	10/20/2010	Date Sampled:	Sep-Oct 1994[c]	Date Sampled:	11/21/1997	Date Sampled:	10/20/1999	Date Sampled:	11/06/2001	Date Sampled:	11/06/2001	Date Sampled:	10/22/2002	Date Sampled:	11/10/2004
			Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)
Volatile Organic Compounds	Acetone	5,500	<	10	<	10.0	<	25	<	200	<	20	<	20	<	20	<	20	<	20
	1,1-Dichloroethane	810		**14**		**18.7**		**44**		**33.9**		**20.2**		**14.4**		**15.1**		**16.5**		**12.8**
	1,2-Dichloroethane (Ethylene dichloride)	5	<	1.0	<	1.00	<	5.0	<	10	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,1-Dichloroethene	7		**35.7**		**56.7**		**130**		**57.6**		**25.3**		**18**		**18.2**		**15.6**		**15.4**
	cis-1,2-Dichloroethene	70		**35.1**		**25.2**		**730**		**676**		**384**		**227**		**233**		**176**		**88.9**
	trans-1,2-Dichloroethene	100	<	1.0	<	1.00		**7.1**	<	10		**2**		**1.7**		**1.8**		**1.4**		**1.92**
	1,4-Dioxane	6.1		**15**		**21**		---[a]		---[a]		---[a]		---[a]		---[a]		---[a]		**10.4**
	Methylene chloride (Dichloromethane)	5	<	5.0	<	5.00	<	5.0	<	100	<	10	<	5.0	<	5.0	<	5.0	<	5.0
	Tetrachloroethene (Perchloroethene)	5		**421**		**504**		**2,500**		**1,460**		**610**		**811**		**585**		**551**		**420**
	1,1,1-Trichloroethane	200		**194**		**307**		**810**		**280**		**121**		**88.1**		**87.8**		**90.6**		**134**
	1,1,2-Trichloroethane	5	<	1.0	<	1.00		**8**		**1.8**	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	Trichloroethene	5		**31.5**		**30.7**		**91**		**61.9**		**44.8**		**46.8**		**44.9**		**43.6**		**34**
	Vinyl Chloride	2	<	1.0	<	1.00		---[a]		---[a]		---[a]		---[a]		---[a]	<	1.0	<	1.0
	Xylenes (total)	10,000	<	3.0	<	6.00	<	5.0	<	30	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0

Bold Font Indicates Detected Parameter

__[a] Parameter not analyzed

< or U Not detected at Reporting Limit

CIN The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C.

C9 Calibration Verification recovery was outside the method control limits for this analyte. The LCS for this analyte met CCV acceptance criteria, and was used to validate the batch.

RL for parameter is greater than MCL

Detected parameter exceeds MCL

Table 2
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Groundwater Sample Results
Volatile Organic Compound MCL Limits

	Analytical Parameter	MCL (µg/L)	MW-11		MW-11		MW-11		MW-11		MW-11		MW-12		MW-12		MW-12		MW-12	
			Date Sampled:	11/15/2006	Date Sampled:	11/15/2006	Date Sampled:	10/30/2008	Date Sampled:	10/30/2008	Date Sampled:	10/20/2010	Date Sampled:	11/21/1997	Date Sampled:	10/20/1998	Date Sampled:	10/20/1999	Date Sampled:	11/09/2000
			Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)
Volatile Organic Compounds	Acetone	5,500	<	10	<	10	<	50	<	10.0	<	10.0	<	10	<	20	<	20	<	20
	1,1-Dichloroethane	810		**14.8**		**15.5**		**6.45**		**8.32**		**6.67**	<	1.0	<	1.0	<	1.0	<	1.0
	1,2-Dichloroethane (Ethylene dichloride)	5	<	1.0	<	1.0	<	5.0	<	1.0	<	1.00	<	1.0	<	1.0	<	1.0	<	1.0
	1,1-Dichloroethene	7		**23.3**		**26.3**		**10.1**		**14.1**		**16.8**	<	2.0	<	2.0	<	2.0	<	2.0
	cis-1,2-Dichloroethene	70		**75.7**		**79.6**		**35.2**		**37.5**		**31.2**	<	1.0	<	1.0	<	1.0	<	1.0
	trans-1,2-Dichloroethene	100		**1.78**		**1.73**	<	5.0	<	1.0	<	1.00	<	1.0	<	1.0	<	1.0	<	1.0
	1,4-Dioxane	6.1		**12**		---[a]		**5.2**		---[a]		**5.8**		---[a]		---[a]		---[a]		---[a]
	Methylene chloride (Dichloromethane)	5	<	5.0	<	5.0	<	25.0	<	5.0	<	5.00	<	10	<	10	<	10	<	5.0
	Tetrachloroethene (Perchloroethene)	5		**422**		**426**		**355**		**391**	CIN	**469**	<	1.0	<	1.0	<	1.0	<	1.0
	1,1,1-Trichloroethane	200		**165**		**172**		**90.6**		**131**		**106**	<	1.0	<	1.0	<	1.0	<	1.0
	1,1,2-Trichloroethane	5	<	1.0	<	1.0	<	5.0	<	1.0	<	1.00	<	1.0	<	1.0	<	1.0	<	1.0
	Trichloroethene	5		**32.6**		**35**		**18.4**		**21.5**		**19.8**	<	1.0	<	1.0	<	1.0	<	1.0
	Vinyl Chloride	2	<	1.0	<	1.0	<	5.0	<	1.0	<	1.00		---[a]		---[a]		---[a]		---[a]
	Xylenes (total)	10,000	<	3.0	<	3.0	<	15.0	<	3.0	<	6.00	<	3.0	<	3.0	<	3.0	<	3.0

Bold Font Indicates Detected Parameter

__[a] Parameter not analyzed
< or U Not detected at Reporting Limit
CIN The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C.
C9 Calibration Verification recovery was outside the method control limits for this analyte. The LCS for this analyte met CCV acceptance criteria, and was used to validate the batch.

RL for parameter is greater than MCL
Detected parameter exceeds MCL

Table 2
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Groundwater Sample Results
Volatile Organic Compound MCL Limits

	Analytical Parameter	MCL (µg/L)	MW-12		MW-12		MW-12		MW-12		MW-12		MW-12		MW-12		MW-12		MW-12	
			Date Sampled:	11/06/2001	Date Sampled:	10/22/2002	Date Sampled:	11/18/2003	Date Sampled:	11/09/2004	Date Sampled:	11/16/2005	Date Sampled:	11/15/2006	Date Sampled:	10/09/2007	Date Sampled:	10/27/2008	Date Sampled:	10/27/2008
			Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)
Volatile Organic Compounds	Acetone	5,500	<	20	<	20	<	20.0	<	20.0	<	20.0	<	10.0	<	10.0	<	10.0		---[a]
	1,1-Dichloroethane	810	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0		---[a]
	1,2-Dichloroethane (Ethylene dichloride)	5	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0		---[a]
	1,1-Dichloroethene	7	<	2.0	<	2.0	<	2.0	<	2.0	<	2.0	<	2.0	<	2.0	<	2.0		---[a]
	cis-1,2-Dichloroethene	70	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0		---[a]
	trans-1,2-Dichloroethene	100	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0		---[a]
	1,4-Dioxane	6.1		---[a]		---[a]	<	2.0	<	2.0	<	6	<	2.0	<	2.0		---[a]	<	2.0
	Methylene chloride (Dichloromethane)	5	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0		---[a]
	Tetrachloroethene (Perchloroethene)	5	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0		---[a]
	1,1,1-Trichloroethane	200	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0		---[a]
	1,1,2-Trichloroethane	5	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0		---[a]
	Trichloroethene	5	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0		---[a]
	Vinyl Chloride	2		---[a]	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0		---[a]
	Xylenes (total)	10,000	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0		---[a]

Bold Font Indicates Detected Parameter

---[a]	Parameter not analyzed
< or U	Not detected at Reporting Limit
CIN	The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C.
C9	Calibration Verification recovery was outside the method control limits for this analyte. The LCS for this analyte met CCV acceptance criteria, and was used to validate the batch.

RL for parameter is greater than MCL
Detected parameter exceeds MCL

Table 2
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Groundwater Sample Results
Volatile Organic Compound MCL Limits

	Analytical Parameter	MCL (µg/L)	MW-12		MW-12		MW-R13		MW-R13		MW-R13		MW-R13		MW-R13		MW-R13		MW-R13		MW-R13	
			Date Sampled:	10/27/2008	Date Sampled:	10/20/2010	Date Sampled:	Sep-Oct 1994[c]	Date Sampled:	11/21/1997	Date Sampled:	11/20/1999	Date Sampled:	11/06/2001	Date Sampled:	10/22/2002	Date Sampled:	11/10/2004	Date Sampled:	11/14/2006
			Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)
Volatile Organic Compounds	Acetone	5,500	<	10.0	<	10.0	<	25	<	400	<	400	<	20	<	20	<	20.0	<	231
	1,1-Dichloroethane	810	<	1.0		**2.46**		**560**		**1,980**		**2,530**		**2,020**		**3,680**		**1,940**		**2,480**
	1,2-Dichloroethane (Ethylene dichloride)	5	<	1.0	<	1.00		**5.8**	<	20	<	20		**6.5**		**10.3**		**5.84**	<	8.0
	1,1-Dichloroethene	7	<	2.0		**19.4**		**250**		**1,120**		**1,510**		**1,510**		**1,430**		**2,610**		**4,650**
	cis-1,2-Dichloroethene	70	<	1.0	<	1.00		**200**		**81.2**		**57.5**		**78.8**		**71.2**		**101**		**53**
	trans-1,2-Dichloroethene	100	<	1.0	<	1.00	<	5.0	<	20	<	20		**1.6**	<	1.0		**2.4**	<	7.50
	1,4-Dioxane	6.1	<	2.0	<	2.0		---[a]		---[a]		---[a]		---[a]		---[a]		**124**		**74.6**
	Methylene chloride (Dichloromethane)	5	<	5.0	<	5.00		**9.1**	<	200	<	200		**39**		**24.3**		**29.9**		**196**
	Tetrachloroethene (Perchloroethene)	5		**12.9**	CIN	**225**		**1,100**		**1,200**		**1,750**		**3,040**		**3,170**		**4,830**		**8,080**
	1,1,1-Trichloroethane	200	<	1.0		**20.4**		**970**		**3,140**		**3,370**		**3,220**		**2,140**		**4,790**		**6,660**
	1,1,2-Trichloroethane	5	<	1.0	<	1.00		**30**		**159**		**195**		**238**		**188**		**270**		**310**
	Trichloroethene	5	<	1.0		**1.17**		**72**	<	20	<	20		**24.3**		**27.4**		**50.6**		**40.5**
	Vinyl Chloride	2	<	1.0	<	1.00		---[a]		---[a]		---[a]		---[a]		**40.6**	<	1.0		**106**
	Xylenes (total)	10,000	<	3.0	<	6.00	<	5.0	<	60	<	60	<	3.0	<	3.0	<	3.0	<	8.50

Bold Font Indicates Detected Parameter

---[a]	Parameter not analyzed
< or U	Not detected at Reporting Limit
CIN	The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C.
C9	Calibration Verification recovery was outside the method control limits for this analyte. The LCS for this analyte met CCV acceptance criteria, and was used to validate the batch.

RL for parameter is greater than MCL
Detected parameter exceeds MCL

Table 2
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Groundwater Sample Results
Volatile Organic Compound MCL Limits

	Analytical Parameter	MCL (µg/L)	MW-R13		MW-R13		MW-R13		MW-R13		MW-R13		MW-R13		MW-15		MW-16		MW-18	
			Date Sampled:	10/30/2008	Date Sampled:	10/30/2008	Date Sampled:	10/30/2008	Date Sampled:	10/30/2008	Date Sampled:	10/31/2008	Date Sampled:	10/20/2010	Date Sampled:	10/22/2002	Date Sampled:	10/22/2002	Date Sampled:	Sep-Oct 1994[c]
			Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)
Volatile Organic Compounds	Acetone	5,500	<	1,000	<	1,000		---[a]		---[a]	<	1,000	<	10.0	<	20	<	20	<	25
	1,1-Dichloroethane	810		**2,740**		**2,700**		---[a]		---[a]		**1,920**	C9	**2,860**	<	1.0	<	1.0	<	5.0
	1,2-Dichloroethane (Ethylene dichloride)	5	<	100	<	100		---[a]		---[a]	<	100	<	1.00	<	1.0	<	1.0	<	5.0
	1,1-Dichloroethene	7		**5,890**		**5,800**		---[a]		---[a]		**3,460**	C9	**5,110**	<	2.0	<	2.0	<	5.0
	cis-1,2-Dichloroethene	70		**100**		**100**		---[a]		---[a]	<	100		**40.5**	<	1.0	<	1.0	<	5.0
	trans-1,2-Dichloroethene	100	<	100	<	100		---[a]		---[a]	<	100		**2.37**	<	1.0	<	1.0	<	5.0
	1,4-Dioxane	6.1		---[a]		---[a]		**78**		**77**		**110**		**92**		---[a]		---[a]		---[a]
	Methylene chloride (Dichloromethane)	5	<	500	<	500		---[a]		---[a]	<	500		**30.5**	<	5.0	<	5.0	<	5.0
	Tetrachloroethene (Perchloroethene)	5		**8,580**		**8,020**		---[a]		---[a]		**5,480**	CIN	**10,300**		**2.1**	<	1.0	<	5.0
	1,1,1-Trichloroethane	200		**7,970**		**8,060**		---[a]		---[a]		**4,720**		**6,240**	<	1.0	<	1.0	<	5.0
	1,1,2-Trichloroethane	5		**337**		**346**		---[a]		---[a]		**221**		**325**	<	1.0	<	1.0	<	5.0
	Trichloroethene	5	<	100	<	100		---[a]		---[a]	<	100		**45.8**	<	1.0	<	1.0	<	5.0
	Vinyl Chloride	2	<	100	<	100		---[a]		---[a]	<	100		**66.4**	<	1.0	<	1.0		---[a]
	Xylenes (total)	10,000	<	300	<	300		---[a]		---[a]	<	300	<	6.00	<	3.0	<	3.0		**7.7**

Bold Font Indicates Detected Parameter

---[a] Parameter not analyzed
< or U Not detected at Reporting Limit
CIN The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C.
C9 Calibration Verification recovery was outside the method control limits for this analyte. The LCS for this analyte met CCV acceptance criteria, and was used to validate the batch.

RL for parameter is greater than MCL
Detected parameter exceeds MCL

Table 2
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Groundwater Sample Results
Volatile Organic Compound MCL Limits

	Analytical Parameter	MCL (µg/L)	MW-18		MW-18		MW-18		MW-18		MW-18		MW-18		MW-18		MW-18		MW-18	
			Date Sampled:	11/21/1997	Date Sampled:	10/20/1998	Date Sampled:	10/20/1999	Date Sampled:	11/09/2000	Date Sampled:	11/06/2001	Date Sampled:	10/22/2002	Date Sampled:	11/18/2003	Date Sampled:	11/09/2004	Date Sampled:	11/16/2005
			Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)
Volatile Organic Compounds	Acetone	5,500	<	10	<	20	<	20	<	20	<	20	<	20	<	20.0	<	20.0	<	20.0
	1,1-Dichloroethane	810	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,2-Dichloroethane (Ethylene dichloride)	5	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,1-Dichloroethene	7	<	2.0	<	2.0	<	2.0	<	2.0	<	2.0	<	2.0	<	2.0	<	2.0	<	2.0
	cis-1,2-Dichloroethene	70	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	trans-1,2-Dichloroethene	100	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,4-Dioxane	6.1		---[a]		---[a]		---[a]		---[a]		---[a]		---[a]	<	2.0	<	2.0	<	6
	Methylene chloride (Dichloromethane)	5	<	10	<	10	<	10	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0
	Tetrachloroethene (Perchloroethene)	5	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,1,1-Trichloroethane	200	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,1,2-Trichloroethane	5	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	Trichloroethene	5	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	Vinyl Chloride	2		---[a]		---[a]		---[a]		---[a]		---[a]	<	1.0	<	1.0	<	1.0	<	1.0
	Xylenes (total)	10,000	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0

Bold Font Indicates Detected Parameter

---[a] Parameter not analyzed

< or U Not detected at Reporting Limit

CIN The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C.

C9 Calibration Verification recovery was outside the method control limits for this analyte. The LCS for this analyte met CCV acceptance criteria, and was used to validate the batch.

RL for parameter is greater than MCL

Detected parameter exceeds MCL

Table 2
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Groundwater Sample Results
Volatile Organic Compound MCL Limits

	Analytical Parameter	MCL (µg/L)	MW-18		MW-18		MW-18		MW-18		MW-19		MW-19		MW-19		MW-19		MW-19		MW-19	
			Date Sampled:	11/15/2006	Date Sampled:	10/09/2007	Date Sampled:	10/29/2008	Date Sampled:	10/20/2010	Date Sampled:	Sep-Oct 1994[c]	Date Sampled:	11/21/1997	Date Sampled	11/21/1997	Date Sampled:	10/20/1998	Date Sampled:	10/20/1999
			Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)
Volatile Organic Compounds	Acetone	5,500	<	10.0	<	10.0	<	10.0	<	10.0	<	25	<	20	<	20	<	20	<	20
	1,1-Dichloroethane	810	<	1.0	<	1.0	<	1.0		**3.54**		**130**		**77.8**		**80.2**		**57.2**		**58.8**
	1,2-Dichloroethane (Ethylene dichloride)	5	<	1.0	<	1.0	<	1.0	<	1.00	<	5.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,1-Dichloroethene	7	<	2.0	<	2.0	<	2.0		**29.7**		**140**		**13.9**		**20.3**		**24.5**		**43.4**
	cis-1,2-Dichloroethene	70	<	1.0	<	1.0	<	1.0	<	1.00		**150**		**78.1**		**79.3**		**88.3**		**106**
	trans-1,2-Dichloroethene	100	<	1.0	<	1.0	<	1.0	<	1.00	<	5.0		**3.5**		**4.1**		**2.2**		**2.1**
	1,4-Dioxane	6.1	<	2.0	<	2.0	<	2.0	<	2.0		---[a]		---[a]		---[a]		---[a]		---[a]
	Methylene chloride (Dichloromethane)	5	<	**22.0**	<	5.0	<	5.0	<	5.00	<	5.0	<	10	<	10	<	10	<	10
	Tetrachloroethene (Perchloroethene)	5	<	1.0	<	1.0	<	1.0		**309**		**1,600**		**180**		**190**		**206**		**374**
	1,1,1-Trichloroethane	200	<	1.0	<	1.0	<	1.0		**38.0**		**900**		**96**		**120**		**163**		**220**
	1,1,2-Trichloroethane	5	<	1.0	<	1.0	<	1.0	<	1.00		**18**		**5.6**		**5.3**		**6.6**		**7.1**
	Trichloroethene	5	<	1.0	<	1.0	<	1.0		**1.47**		**170**		**49.4**		**52.5**		**55.2**		**73.4**
	Vinyl Chloride	2	<	1.0	<	1.0	<	1.0	<	1.00		---[a]		---[a]		---[a]		---[a]		---[a]
	Xylenes (total)	10,000	<	3.0	<	3.0	<	3.0	<	3.00	<	5.0	<	3.0	<	3.0	<	3.0	<	3.0

Bold Font Indicates Detected Parameter

---[a] Parameter not analyzed
< or U Not detected at Reporting Limit
CIN The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C.
C9 Calibration Verification recovery was outside the method control limits for this analyte. The LCS for this analyte met CCV acceptance criteria, and was used to validate the batch.

RL for parameter is greater than MCL
Detected parameter exceeds MCL

Table 2
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Groundwater Sample Results
Volatile Organic Compound MCL Limits

	Analytical Parameter	MCL (µg/L)	MW-19		MW-19		MW-19		MW-19		MW-19		MW-19		MW-19		MW-19		MW-19	
			Date Sampled:	11/09/2000	Date Sampled:	11/06/2001	Date Sampled:	10/22/2002	Date Sampled:	11/18/2003	Date Sampled:	11/09/2004	Date Sampled:	11/09/2004	Date Sampled:	11/16/2005	Date Sampled:	11/16/2005	Date Sampled:	11/17/2006
			Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)
Volatile Organic Compounds	Acetone	5,500	<	20	<	20	<	20	<	20.0	<	20.0	<	20.0	<	20.0	<	20.0	<	10.0
	1,1 Dichloroethane	810		**35.6**		**9.6**		**5.1**		**11.7**		**2.8**		**2.7**		**2.15**		**2.33**		**5.97**
	1,2-Dichloroethane (Ethylene dichloride)	5	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,1-Dichloroethene	7		**10**		**7.9**		**5**		**21.9**		**5.77**		**5.41**		**3.45**		**3.69**		**9.85**
	cis-1,2-Dichloroethene	70		**17.9**		**13.2**		**8.9**		**19.7**		**4.72**		**4.77**		**3.19**		**3.24**		**7.41**
	trans-1,2-Dichloroethene	100	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,4-Dioxane	6.1		---[a]		---[a]		---[a]		**14.6**		**9.4**		**9.8**	<	6	<	6		**17**
	Methylene chloride (Dichloromethane)	5	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0
	Tetrachloroethene (Perchloroethene)	5		**213**		**187**		**130**		**235**		**129**		**122**		**76.4**		**73.4**		**124**
	1,1,1-Trichloroethane	200		**30.6**		**45.4**		**38.9**		**101**		**26.3**		**26.2**		**15.4**		**15.3**		**32.7**
	1,1,2-Trichloroethane	5	<	1.0		**1**	<	1.0		**1.28**	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	Trichloroethene	5		**21.9**		**14.8**		**11.2**		**24.3**		**9.23**		**9.75**		**4.76**		**4.76**		**8.75**
	Vinyl Chloride	2		---[a]		---[a]	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	Xylenes (total)	10,000	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0

Bold Font Indicates Detected Parameter

---[a]	Parameter not analyzed
< or U	Not detected at Reporting Limit
CIN	The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C.
C9	Calibration Verification recovery was outside the method control limits for this analyte. The LCS for this analyte met CCV acceptance criteria, and was used to validate the batch.

RL for parameter is greater than MCL
Detected parameter exceeds MCL

Table 2
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Groundwater Sample Results
Volatile Organic Compound MCL Limits

	Analytical Parameter	MCL (µg/L)	MW-19		MW-19		MW-19		MW-19		MW-19		MW-19		MW-19		MW-19		MW-19	
			Date Sampled:	11/09/2000	Date Sampled:	11/06/2001	Date Sampled:	10/22/2002	Date Sampled:	11/18/2003	Date Sampled:	11/09/2004	Date Sampled:	11/09/2004	Date Sampled:	11/16/2005	Date Sampled:	11/16/2005	Date Sampled:	11/17/2006
			Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)
Volatile Organic Compounds	Acetone	5,500	<	20	<	20	<	20	<	20.0	<	20.0	<	20.0	<	20.0	<	20.0	<	10.0
	1,1 Dichloroethane	810		**35.6**		**9.6**		**5.1**		**11.7**		**2.8**		**2.7**		**2.15**		**2.33**		**5.97**
	1,2-Dichloroethane (Ethylene dichloride)	5	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,1-Dichloroethene	7		**10**		**7.9**		**5**		**21.9**		**5.77**		**5.41**		**3.45**		**3.69**		**9.85**
	cis-1,2-Dichloroethene	70		**17.9**		**13.2**		**8.9**		**19.7**		**4.72**		**4.77**		**3.19**		**3.24**		**7.41**
	trans-1,2-Dichloroethene	100	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,4-Dioxane	6.1		---[a]		---[a]		---[a]		**14.6**		**9.4**		**9.8**	<	6	<	6		**17**
	Methylene chloride (Dichloromethane)	5	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0
	Tetrachloroethene (Perchloroethene)	5		**213**		**187**		**130**		**235**		**129**		**122**		**76.4**		**73.4**		**124**
	1,1,1-Trichloroethane	200		**30.6**		**45.4**		**38.9**		**101**		**26.3**		**26.2**		**15.4**		**15.3**		**32.7**
	1,1,2-Trichloroethane	5	<	1.0		**1**	<	1.0		**1.28**	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	Trichloroethene	5		**21.9**		**14.8**		**11.2**		**24.3**		**9.23**		**9.75**		**4.76**		**4.76**		**8.75**
	Vinyl Chloride	2		---[a]		---[a]	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	Xylenes (total)	10,000	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0

Bold Font Indicates Detected Parameter

---[a] Parameter not analyzed

< or U Not detected at Reporting Limit

CIN The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C.

C9 Calibration Verification recovery was outside the method control limits for this analyte. The LCS for this analyte met CCV acceptance criteria, and was used to validate the batch.

RL for parameter is greater than MCL

Detected parameter exceeds MCL

Table 2
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Groundwater Sample Results
Volatile Organic Compound MCL Limits

		MCL (µg/L)	MW-19		MW-19		MW-19		MW-19		MW-19		MW-19		MW-19		MW-19		MW-19	
			Date Sampled:	11/09/2000	Date Sampled:	11/06/2001	Date Sampled:	10/22/2002	Date Sampled:	11/18/2003	Date Sampled:	11/09/2004	Date Sampled:	11/09/2004	Date Sampled:	11/16/2005	Date Sampled:	11/16/2005	Date Sampled:	11/17/2006
	Analytical Parameter		Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)
Volatile Organic Compounds	Acetone	5,500	<	20	<	20	<	20	<	20.0	<	20.0	<	20.0	<	20.0	<	20.0	<	10.0
	1,1 Dichloroethane	810		**35.6**		**9.6**		**5.1**		**11.7**		**2.8**		**2.7**		**2.15**		**2.33**		**5.97**
	1,2-Dichloroethane (Ethylene dichloride)	5	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,1-Dichloroethene	7		**10**		**7.9**		**5**		**21.9**		**5.77**		**5.41**		**3.45**		**3.69**		**9.85**
	cis-1,2-Dichloroethene	70		**17.9**		**13.2**		**8.9**		**19.7**		**4.72**		**4.77**		**3.19**		**3.24**		**7.41**
	trans-1,2-Dichloroethene	100	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,4-Dioxane	6.1		---[a]		---[a]		---[a]		**14.6**		**9.4**		**9.8**	<	6	<	6		**17**
	Methylene chloride (Dichloromethane)	5	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0
	Tetrachloroethene (Perchloroethene)	5		**213**		**187**		**130**		**235**		**129**		**122**		**76.4**		**73.4**		**124**
	1,1,1-Trichloroethane	200		**30.6**		**45.4**		**38.9**		**101**		**26.3**		**26.2**		**15.4**		**15.3**		**32.7**
	1,1,2-Trichloroethane	5	<	1.0		**1**	<	1.0		**1.28**	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	Trichloroethene	5		**21.9**		**14.8**		**11.2**		**24.3**		**9.23**		**9.75**		**4.76**		**4.76**		**8.75**
	Vinyl Chloride	2		---[a]		---[a]	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	Xylenes (total)	10,000	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0

Bold Font Indicates Detected Parameter

---[a] Parameter not analyzed

< or U Not detected at Reporting Limit

CIN The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C.

C9 Calibration Verification recovery was outside the method control limits for this analyte. The LCS for this analyte met CCV acceptance criteria, and was used to validate the batch.

RL for parameter is greater than MCL

Detected parameter exceeds MCL

Table 2
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Groundwater Sample Results
Volatile Organic Compound MCL Limits

	Analytical Parameter	MCL (µg/L)	MW-19		MW-19		MW-19		MW-19		MW-19		MW-19		D-01		MW-20		MW-20	
			Date Sampled:	10/10/2007	Date Sampled:	10/10/2007	Date Sampled:	10/29/2008	Date Sampled:	10/15/2009	Date Sampled:	10/15/2009	Date Sampled:	10/20/2010	Date Sampled:	10/20/2010	Date Sampled:	Sep-Oct 1994[c]	Date Sampled:	11/21/1997
			Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)
Volatile Organic Compounds	Acetone	5,500	<	10.0	<	10.0	<	10.0	<	10.0	<	10.0	<	10.0	<	10.0	<	25	<	200
	1,1-Dichloroethane	810	<	1.0	<	1.0		**1.12**		**1.6**		**1.56**		**25.2**		**22.2**		**70**		**130**
	1,2-Dichloroethane (Ethylene dichloride)	5	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.00	<	1.00	<	5.0	<	10
	1,1-Dichloroethene	7		**6.31**		**6.49**		**2.05**	<	2.0		**2.2**		**44.0**		**40.3**		**110**		**70**
	cis-1,2-Dichloroethene	70		**1.98**		**1.75**		**1.27**		**3.41**		**3.72**		**13.6**		**11.1**		**90**		**230**
	trans-1,2-Dichloroethene	100	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.00	<	1.00	<	5.0	<	10
	1,4-Dioxane	6.1		**5**		**5.1**	<	2.0		**3.5**		**3.1**		**22**		**27**		---[a]		---[a]
	Methylene chloride (Dichloromethane)	5	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.00	<	5.00	<	5.0	<	100
	Tetrachloroethene (Perchloroethene)	5		**64.5**		**67.2**		**40**		**38**		**38.2**	CIN	**432**	CIN	**399**		**1,800**		**1,020**
	1,1,1-Trichloroethane	200		**2.66**		**2.46**		**7.66**		**6.83**		**6.71**		**64.9**		**59.5**		**760**		**316**
	1,1,2-Trichloroethane	5	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0		**1.02**	<	1.00		**20**		**14.4**
	Trichloroethene	5		**3.52**		**3.37**		**1.9**		**3.64**		**4.06**		**14.4**		**12.4**		**26**		**38.2**
	Vinyl Chloride	2	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.00	<	1.00		---[a]		---[a]
	Xylenes (total)	10,000	<	3.0	<	3.0	<	3.0	<	4.0	<	4.0	<	6.00	<	6.00	<	5.0	<	30

Bold Font Indicates Detected Parameter

---[a] Parameter not analyzed

< or U Not detected at Reporting Limit

CIN The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C.

C9 Calibration Verification recovery was outside the method control limits for this analyte. The LCS for this analyte met CCV acceptance criteria, and was used to validate the batch.

RL for parameter is greater than MCL

Detected parameter exceeds MCL

Table 2
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Groundwater Sample Results
Volatile Organic Compound MCL Limits

	Analytical Parameter	MCL (µg/L)	MW-20		MW-20		MW-20		MW-20		MW-20		MW-20		MW-20		MW-20		MW-20	
			Date Sampled:	10/20/1998	Date Sampled:	10/20/1998	Date Sampled:	10/20/1999	Date Sampled:	10/20/1999	Date Sampled:	11/09/2000	Date Sampled:	11/06/2001	Date Sampled:	10/22/2002	Date Sampled:	10/22/2002	Date Sampled:	11/19/2003
			Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)
Volatile Organic Compounds	Acetone	5,500	<	20	<	20	<	40	<	20	<	20	<	20	<	20	<	20	<	20.0
	1,1-Dichloroethane	810		**77.6**		**68.8**		**58.9**		**68.3**		**74.1**		**49.2**		**43.3**		**33**		**57.4**
	1,2-Dichloroethane (Ethylene dichloride)	5	<	1.0	<	1.0	<	2.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,1-Dichloroethene	7		**61.2**		**73.4**		**47.5**		**57.7**		**54.2**		**17.1**		**33**		**47.7**		**45.9**
	cis-1,2-Dichloroethene	70		**221**		**219**		**148**		**168**		**275**		**279**		**182**		**182**		**158**
	trans-1,2-Dichloroethene	100		**4.6**		**3.2**	<	2.0		**1.8**		**6.6**		**3.2**		**3.2**		**2.3**		**3.9**
	1,4-Dioxane	6.1		---[a]		---[a]		---[a]		---[a]		---[a]		---[a]		---[a]		---[a]		**32.5**
	Methylene chloride (Dichloromethane)	5	<	10	<	10	<	20	<	10	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0
	Tetrachloroethene (Perchloroethene)	5		**1,450**		**1,490**		**957**		**1,200**		**915**		**848**		**1,330**		**1,250**		**1,080**
	1,1,1-Trichloroethane	200		**304**		**307**		192		**233**		**222**		**102**		**168**		**216**		**143**
	1,1,2-Trichloroethane	5		**11.4**		**11.7**		**7.8**		**8.1**		**7.1**		**6.5**		**6.3**		**5.9**		**4.85**
	Trichloroethene	5		**51.2**		**50.9**		**34.7**		**42.2**		**48.6**		**35.8**		**46.8**		**56.4**		**39.8**
	Vinyl Chloride	2		---[a]		---[a]		---[a]		---[a]		---[a]		---[a]	<	1.0	<	1.0	<	1.0
	Xylenes (total)	10,000	<	3.0	<	3.0	<	6.0	<	3.0	<	3.0	<	15	<	3.0	<	3.0	<	3.0

Bold Font Indicates Detected Parameter

---[a]	Parameter not analyzed
< or U	Not detected at Reporting Limit
CIN	The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C.
C9	Calibration Verification recovery was outside the method control limits for this analyte. The LCS for this analyte met CCV acceptance criteria, and was used to validate the batch.

RL for parameter is greater than MCL
Detected parameter exceeds MCL

Table 2
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Groundwater Sample Results
Volatile Organic Compound MCL Limits

	Analytical Parameter	MCL (µg/L)	MW-20		MW-20		MW-20		MW-20		MW-20		MW-20		MW-20		MW-20		MW-20		MW-20	
			Date Sampled:	11/19/2003	Date Sampled:	11/10/2004	Date Sampled:	11/16/2005	Date Sampled:	11/17/2006	Date Sampled:	10/10/2007	Date Sampled:	10/30/2008	Date Sampled:	10/30/2008	Date Sampled:	10/30/2008	Date Sampled:	10/15/2009		
			Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)		
Volatile Organic Compounds	Acetone	5,500	<	20.0	<	20.0	<	20.0	<	10.0	<	10.0	<	50.0		---[a]	<	50.0	<	10.0		
	1,1 Dichloroethane	810		**64.9**		**47.9**		**47.7**		**41.1**		**27.2**		**15.8**		---[a]		**27.6**		**26.5**		
	1,2-Dichloroethane (Ethylene dichloride)	5	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	5.0		---[a]	<	5.0	<	1.0		
	1,1-Dichloroethene	7		**57.3**		**40.5**		**50.6**		**36.2**		**62.8**		**10.6**		---[a]		**25.3**		**21**		
	cis-1,2-Dichloroethene	70		**176**		**124**		**140**		**107**		**90.4**		**41.4**		---[a]		**71.6**		**57.4**		
	trans-1,2-Dichloroethene	100		**4.03**		**4.45**		**3.4**		**6.39**		**5.39**	<	5.0		---[a]	<	5.0		**2.37**		
	1,4-Dioxane	6.1		**43.8**		**90.9**	<	30		**83**		**66**		---[a]		**64**		**54**		**39**		
	Methylene chloride (Dichloromethane)	5	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	25		---[a]	<	25	<	5.0		
	Tetrachloroethene (Perchloroethene)	5		**1,090**		**590**		**967**		**642**		**582**		**88.8**		---[a]		**535**		**408**		
	1,1,1-Trichloroethane	200		**166**		**121**		**163**		**102**		**45.3**		**25.9**		---[a]		**65.8**		**67**		
	1,1,2-Trichloroethane	5		**5.02**		**3.84**		**3.57**		**3.1**		**2.69**	<	5.0		---[a]	<	5.0		**1.65**		
	Trichloroethene	5		**45.7**		**31.7**		**42.5**		**30.4**		**29.3**		**8.7**		---[a]		**23.2**		**21.7**		
	Vinyl Chloride	2	<	1.0	<	1.0	<	1.0		**1.81**		**2.96**	<	5.0		---[a]	<	5.0	<	1.0		
	Xylenes (total)	10,000	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	15.0		---[a]	<	15.0	<	4.0		

Bold Font Indicates Detected Parameter

---[a] Parameter not analyzed
< or U Not detected at Reporting Limit
CIN The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C.
C9 Calibration Verification recovery was outside the method control limits for this analyte. The LCS for this analyte met CCV acceptance criteria, and was used to validate the batch.

RL for parameter is greater than MCL
Detected parameter exceeds MCL

Table 2
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Groundwater Sample Results
Volatile Organic Compound MCL Limits

	Analytical Parameter	MCL (µg/L)	MW-20		MW-29		MW-R30		MW-R30		MW-R30		MW-R30		MW-R30		MW-R30		MW-R30	
			Date Sampled:	10/20/2010	Date Sampled:	10/22/2002	Date Sampled:	10/22/2002	Date Sampled:	11/17/2003	Date Sampled:	11/09/2004	Date Sampled:	11/15/2005	Date Sampled:	11/14/2006	Date Sampled:	10/09/2007	Date Sampled:	10/29/2008
			Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)
Volatile Organic Compounds	Acetone	5,500	<	10.0	<	20.0	<	20	<	20.0	<	20.0	<	20.0	<	10.0	<	10.0	<	10.0
	1,1-Dichloroethane	810		**38.2**	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,2-Dichloroethane (Ethylene dichloride)	5	<	1.00	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,1-Dichloroethene	7		**89.6**	<	2.0	<	2.0	<	2.0	<	2.0	<	2.0	<	2.0	<	2.0	<	2.0
	cis-1,2-Dichloroethene	70		**55.8**	<	1.0		**2.8**	<	1.0	<	1.0		**1.47**	<	1.0	<	1.0		**2.06**
	trans-1,2-Dichloroethene	100		**2.98**	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,4-Dioxane	6.1		**42**		---[a]		---[a]	<	2.0	<	2.0		---[a]		---[a]		---[a]		---[a]
	Methylene chloride (Dichloromethane)	5	<	5.00	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0
	Tetrachloroethene (Perchloroethene)	5	CIN	**719**		**6.1**		**1.4**	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,1,1-Trichloroethane	200		**137**		**1.1**	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,1,2-Trichloroethane	5		**2.52**	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	Trichloroethene	5		**22.4**		**4.3**	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	Vinyl Chloride	2	<	1.00	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	Xylenes (total)	10,000	<	6.00	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0

Bold Font Indicates Detected Parameter

---[a] Parameter not analyzed
< or U Not detected at Reporting Limit
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RL for parameter is greater than MCL
Detected parameter exceeds MCL

Table 2
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Groundwater Sample Results
Volatile Organic Compound MCL Limits

		MCL (µg/L)	MW-R30		MW-R30		MW-R30		MW-31		MW-31		MW-31		MW-31		MW-31		MW-31	
			Date Sampled:	10/29/2008	Date Sampled:	10/15/2009	Date Sampled:	10/20/2010	Date Sampled:	Sep-Oct 1994[c]	Date Sampled:	11/21/1997	Date Sampled:	10/20/1998	Date Sampled:	10/20/1999	Date Sampled:	11/09/2000	Date Sampled:	11/06/2001
	Analytical Parameter		Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)
Volatile Organic Compounds	Acetone	5,500	<	10.0	<	10.0	<	10.0	<	25	<	20	<	20	<	20	<	20	<	20
	1,1-Dichloroethane	810	<	1.0	<	1.00	C9,<	1.00	<	5.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,2-Dichloroethane (Ethylene dichloride)	5	<	1.0	<	1.00	<	1.00	<	5.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,1-Dichloroethene	7	<	2.0	<	2.00	C9,<	2.00	<	5.0	<	2.0	<	2.0	<	2.0	<	2.0	<	2.0
	cis-1,2-Dichloroethene	70	<	1.0	<	1.00	C9	**29.4**		**8.3**	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	trans-1,2-Dichloroethene	100	<	1.0	<	1.00	<	1.00	<	5.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,4-Dioxane	6.1		---[a]		---[a]		---[a]		---[a]		---[a]		---[a]		---[a]		---[a]		---[a]
	Methylene chloride (Dichloromethane)	5	<	5.0	<	5.00	<	5.00	<	5.0	<	10	<	10	<	10	<	5.0	<	5.0
	Tetrachloroethene (Perchloroethene)	5		**10.2**		**63.6**	CIN	**3.83**		**36**	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,1,1-Trichloroethane	200	<	1.0		**3.07**	<	5.00		**25**	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,1,2-Trichloroethane	5	<	1.0	<	1.00	<	1.00	<	5.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	Trichloroethene	5	<	1.0		**37.6**		**74.8**		**19**	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	Vinyl Chloride	2	<	1.0	<	1.00	C9,<	1.00		---[a]		---[a]		---[a]		---[a]		---[a]		---[a]
	Xylenes (total)	10,000	<	3.0	<	4.00	<	6.00	<	5.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0

Bold Font Indicates Detected Parameter

---[a]	Parameter not analyzed
< or U	Not detected at Reporting Limit
CIN	The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C.
C9	Calibration Verification recovery was outside the method control limits for this analyte. The LCS for this analyte met CCV acceptance criteria, and was used to validate the batch.

RL for parameter is greater than MCL
Detected parameter exceeds MCL

Table 2
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Groundwater Sample Results
Volatile Organic Compound MCL Limits

	Analytical Parameter	MCL (µg/L)	MW-31		MW-31		MW-31		MW-31		MW-31		MW-31		MW-31		MW-31		MW-31	
			Date Sampled:	10/22/2002	Date Sampled:	11/17/2003	Date Sampled:	11/08/2004	Date Sampled:	11/16/2005	Date Sampled:	11/13/2006	Date Sampled:	10/08/2007	Date Sampled:	10/27/2008	Date Sampled:	10/27/2008	Date Sampled:	10/15/2009
			Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)
Volatile Organic Compounds	Acetone	5,500	<	20	<	20.0	<	20.0	<	20.0	<	10.0	<	10.0	<	10.0	<	10.0	<	10.0
	1,1-Dichloroethane	810	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.00
	1,2-Dichloroethane (Ethylene dichloride)	5	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.00
	1,1-Dichloroethene	7	<	2.0	<	2.0	<	2.0	<	2.0	<	2.0	<	2.0	<	2.0	<	2.0	<	2.00
	cis-1,2-Dichloroethene	70	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.00
	trans-1,2-Dichloroethene	100	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.00
	1,4-Dioxane	6.1		---[a]	<	2.0	<	2.0		---[a]		---[a]		---[a]		---[a]		---[a]		---[a]
	Methylene chloride (Dichloromethane)	5	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0	<	5.00
	Tetrachloroethene (Perchloroethene)	5	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0		**11.3**		**5.72**
	1,1,1-Trichloroethane	200	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.00
	1,1,2-Trichloroethane	5	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.00
	Trichloroethene	5	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.00
	Vinyl Chloride	2	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.00
	Xylenes (total)	10,000	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	4.00

Bold Font Indicates Detected Parameter

---[a] Parameter not analyzed
< or U Not detected at Reporting Limit
CIN The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C.
C9 Calibration Verification recovery was outside the method control limits for this analyte. The LCS for this analyte met CCV acceptance criteria, and was used to validate the batch.

RL for parameter is greater than MCL
Detected parameter exceeds MCL

Table 2
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Groundwater Sample Results
Volatile Organic Compound MCL Limits

	Analytical Parameter	MCL (µg/L)	MW-31		MW-32		MW-32		MW-32		MW-32		MW-32		MW-32		MW-32		MW-32	
			Date Sampled:	10/20/2010	Date Sampled:	Sep-Oct 1994[c]	Date Sampled:	11/21/1997	Date Sampled:	10/20/1999	Date Sampled:	11/06/2001	Date Sampled:	10/22/2002	Date Sampled:	11/08/2004	Date Sampled:	11/14/2006	Date Sampled:	10/28/2008
			Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)
Volatile Organic Compounds	Acetone	5,500	<	10.0	<	25	<	20	<	20	<	20	<	20	<	20.0	<	10.0	<	10.0
	1,1-Dichloroethane	810	C9,<	1.00	<	5.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,2-Dichloroethane (Ethylene dichloride)	5	<	1.00	<	5.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,1-Dichloroethene	7	C9,<	2.00	<	5.0	<	2.0	<	2.0	<	2.0	<	2.0	<	2.0	<	2.0	<	2.0
	cis-1,2-Dichloroethene	70	C9,<	1.00	<	5.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	trans-1,2-Dichloroethene	100	<	1.00	<	5.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,4-Dioxane	6.1		---[a]		---[a]		---[a]		---[a]		---[a]		---[a]	<	2.0		---[a]		---[a]
	Methylene chloride (Dichloromethane)	5	<	5.00	<	5.0	<	10	<	10	<	5.0	<	5.0	<	5.0	<	5.0	<	5.0
	Tetrachloroethene (Perchloroethene)	5	CIN	**2.04**	<	5.0		**220**	<	1.0		**1.9**	<	1.0	<	1.0	<	1.0	<	1.0
	1,1,1-Trichloroethane	200	<	5.00	<	5.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	1,1,2-Trichloroethane	5	<	1.00	<	5.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	Trichloroethene	5		**2.21**	<	5.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0	<	1.0
	Vinyl Chloride	2	C9,<	1.00		---[a]		---[a]		---[a]		---[a]	<	1.0	<	1.0	<	1.0	<	1.0
	Xylenes (total)	10,000	<	6.00	<	5.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0	<	3.0

Bold Font Indicates Detected Parameter

---[a] Parameter not analyzed

< or U Not detected at Reporting Limit

CIN The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C.

C9 Calibration Verification recovery was outside the method control limits for this analyte. The LCS for this analyte met CCV acceptance criteria, and was used to validate the batch.

RL for parameter is greater than MCL

Detected parameter exceeds MCL

Table 2
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Groundwater Sample Results
Volatile Organic Compound MCL Limits

	Analytical Parameter	MCL (µg/L)	MW-32		MW-33		MW-33		MW-33		MW-33		MW-33		MW-33		MW-33		MW-33	
			Date Sampled:	10/20/2010	Date Sampled:	11/15/2005	Date Sampled:	11/13/2006	Date Sampled:	10/08/2007	Date Sampled:	10/28/2008	Date Sampled:	10/28/2008	Date Sampled:	10/28/2008	Date Sampled:	10/15/2009	Date Sampled:	10/20/2010
			Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)	Qualifer	Result (µg/l)
Volatile Organic Compounds	Acetone	5,500	<	10.0	<	20.0	<	10.0	<	10.0	<	10.0		---[a]	<	10.0	<	10.0	<	10.0
	1,1-Dichloroethane	810	C9,<	1.00	<	1.0	<	1.0	<	1.0	<	1.0		---[a]	<	1.0	<	1.00	<	1.00
	1,2-Dichloroethane (Ethylene dichloride)	5	<	1.00	<	1.0	<	1.0	<	1.0	<	1.0		---[a]	<	1.0	<	1.00	<	1.00
	1,1-Dichloroethene	7	C9,<	2.00	<	2.0	<	2.0	<	2.0	<	2.0		---[a]	<	2.0	<	2.00		**2.75**
	cis-1,2-Dichloroethene	70	C9,<	1.00	<	1.0	<	1.0	<	1.0	<	1.0		---[a]	<	1.0	<	1.00	<	1.00
	trans-1,2-Dichloroethene	100	<	1.00	<	1.0	<	1.0	<	1.0	<	1.0		---[a]	<	1.0	<	1.00	<	1.00
	1,4-Dioxane	6.1		---[a]	<	6	<	5.19	<	2.0		---[a]	<	2.0	<	2.0	<	2.00	<	2.0
	Methylene chloride (Dichloromethane)	5	<	5.00	<	5.0	<	5.0	<	5.0	<	5.0		---[a]	<	5.0	<	5.00	<	5.00
	Tetrachloroethene (Perchloroethene)	5	CIN,<	1.00	<	1.0	<	1.0	<	1.0	<	1.0		---[a]		**19.9**		**3.18**		**54.6**
	1,1,1-Trichloroethane	200	<	5.00	<	1.0	<	1.0	<	1.0	<	1.0		---[a]	<	1.0	<	1.00		**3.95**
	1,1,2-Trichloroethane	5	<	1.00	<	1.0	<	1.0	<	1.0	<	1.0		---[a]	<	1.0	<	1.00	<	1.00
	Trichloroethene	5		**2.50**	<	1.0	<	1.0	<	1.0	<	1.0		---[a]	<	1.0	<	1.00	<	1.00
	Vinyl Chloride	2	C9,<	1.00	<	1.0	<	1.0	<	1.0	<	1.0		---[a]	<	1.0	<	1.00	<	1.00
	Xylenes (total)	10,000	<	6.00	<	3.0	<	3.0	<	3.0	<	3.0		---[a]	<	3.0	<	4.00	<	3.00

Bold Font Indicates Detected Parameter

---[a]	Parameter not analyzed
< or U	Not detected at Reporting Limit
CIN	The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C.
C9	Calibration Verification recovery was outside the method control limits for this analyte. The LCS for this analyte met CCV acceptance criteria, and was used to validate the batch.

RL for parameter is greater than MCL
Detected parameter exceeds MCL

Table 2
Sauer Danfoss
2800 East 13th Street
Ames, Iowa
Groundwater Sample Results
Volatile Organic Compound MCL Limits

	Analytical Parameter	MCL (µg/L)	MW-34	
			Date Sampled:	10/20/2010
			Qualifer	Result (µg/l)
Volatile Organic Compounds	Acetone	5,500	<	10.0
	1,1-Dichloroethane	810	C9,<	1.00
	1,2-Dichloroethane (Ethylene dichloride)	5	<	1.00
	1,1-Dichloroethene	7	C9,<	2.00
	cis-1,2-Dichloroethene	70	C9,<	1.00
	trans-1,2-Dichloroethene	100	<	1.00
	1,4-Dioxane	6.1	<	2.0
	Methylene chloride (Dichloromethane)	5	<	5.00
	Tetrachloroethene (Perchloroethene)	5	CIN,<	1.00
	1,1,1-Trichloroethane	200	<	5.00
	1,1,2-Trichloroethane	5	<	1.00
	Trichloroethene	5	<	1.00
	Vinyl Chloride	2	C9,<	1.00
	Xylenes (total)	10,000	<	6.00

Bold Font Indicates Detected Parameter

---[a]	Parameter not analyzed
< or U	Not detected at Reporting Limit
CIN	The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C.
C9	Calibration Verification recovery was outside the method control limits for this analyte. The LCS for this analyte met CCV acceptance criteria, and was used to validate the batch.

RL for parameter is greater than MCL
Detected parameter exceeds MCL

Table 3

Groundwater Elevation Measurements

Table 3
Groundwater Elevation Measurements
Sauer Danfoss
2800 East 13th Street
Ames, Iowa

Well ID	Date Installed	Groundwater Interval	Approximate Stratigraphic Unit Screened	Ground (ft ASL)	TOC (ft ASL)	Depth to Water (ft)	Groundwater Elevation (ft ASL)	Depth to Water (ft)	Groundwater Elevation (ft ASL)	Depth to Water (ft)	Groundwater Elevation (ft ASL)	Depth to Water (ft)	Groundwater Elevation (ft ASL)	Depth to Water (ft)	Groundwater Elevation (ft ASL)	Depth to Water (ft)	Groundwater Elevation (ft ASL)	Depth to Water (ft)	Groundwater Elevation (ft ASL)	Depth to Water (ft)	Groundwater Elevation (ft ASL)	Depth to Water (ft)	Groundwater Elevation (ft ASL)	Depth to Water (ft)	Groundwater Elevation (ft ASL)
						2/4/97-2/6/97		11/21/97		10/20/98		10/20/99		11/09/00		11/06/01		10/22/02		11/17/03		11/09/04		11/14/05	
MW-1	1997?	Unconfined	Glacial Till, Morgan Member?	971.2	973.71	6.31	967.40	7.02	966.69	6.63	967.08	7.41	966.30	6.45	967.26	6.59	967.12	6.35	967.36	6.61	967.10	6.42	967.29		abandoned
MW-R2S	1997?	Unconfined	Glacial Till, Morgan Member?	968.0	970.49	8.55	961.94	8.21	962.28	7.70	962.79	9.03	961.46	7.26	963.23	8.44	962.05	8.63	961.86	7.80	962.69	8.18	962.31	9.40	961.09
MW-3	1997?	Unconfined	Glacial Till, Morgan Member?	966.6	969.05	5.77	963.28	5.04	964.01	4.92	964.13	6.60	962.45	5.17	963.88	5.48	963.57	5.88	963.17	4.90	964.15	5.41	963.64		abandoned
MW-4	1997?	Unconfined	Glacial Till, Morgan Member?	967.9	970.39	5.28	965.11	5.29	965.10	5.21	965.18	6.41	963.98	5.33	965.06	5.38	965.01	5.72	964.67	5.24	965.15	5.50	964.89		abandoned
MW-5	1997?	Unconfined	Glacial Till, Morgan Member?	963.3	965.82	7.79	958.03	8.64	957.18	8.29	957.53	9.63	956.19	8.45	957.37	8.14	957.68	8.75	957.07	7.83	957.99	8.01	957.81	9.83	955.99
MW-R6S	1997?	Unconfined	Glacial Till, Morgan Member?	962.9	965.39	7.93	957.46	8.92	956.47	8.42	956.97	9.78	955.61	8.78	956.61	8.54	956.85	9.11	956.28	8.45	956.94	8.13	957.26	10.06	955.33
MW-10	1997?	Unconfined	Glacial Till, Morgan Member?	961.64	964.22	9.12	955.10	9.86	954.36	9.84	954.38	10.37	953.85	9.99	954.23	9.29	954.93	9.75	954.47	9.76	954.46	9.52	954.70	10.53	953.69
MW-11	1997?	Unconfined	Glacial Till, Morgan Member?	960.72	963.26	5.20	958.06	11.84	951.42	12.14	951.12	12.37	950.89	12.62	950.64	11.50	951.76	11.64	951.62	12.05	951.21	11.98	951.28	12.40	950.86
MW-12	1997?	Unconfined	Glacial Till, Morgan Member?	957.20	959.70	10.74	948.96	21.47	938.23	17.46	942.24	20.28	939.42	20.88	938.82	20.14	939.56	18.79	940.91	19.59	940.11	19.19	940.51	20.92	938.78
MW-R13	1997?	Unconfined	Glacial Till, Morgan Member and Alden Member?	963.74	965.67	8.82	956.85	9.63	956.04	9.78	955.89	11.50	954.17	10.21	955.46	8.53	957.14	9.27	956.40	9.36	956.31	9.30	956.37	11.09	954.58
MW-R14	1997?	Unconfined	Glacial Till, Morgan Member?	963.3	965.83	10.97	954.86	12.79	953.04	12.45	953.38	12.52	953.31	13.76	952.07	11.14	954.69	11.40	954.43	12.76	953.07	12.48	953.35	13.31	952.52
MW-15	1997?	Unconfined	Glacial Till, Morgan Member?	955.09	957.99	6.01	951.98	8.90	949.09	8.72	949.27	9.77	948.22	10.70	947.29	7.23	950.76	7.37	950.62	7.93	950.06	8.09	949.90	9.22	948.77
MW-16	1997?	Unconfined	Glacial Till, Morgan Member?	963.4	965.90	10.92	954.98	14.10	951.80	13.49	952.41	13.25	952.65	15.73	950.17	11.39	954.51	11.74	954.16	11.51	954.39	12.87	953.03	14.81	951.09
MW-18	1997?	Unconfined	Glacial Till, Morgan Member?	953.86	956.73	6.39	950.34	8.07	948.66	7.95	948.78	8.45	948.28	14.30	942.43	8.12	948.61	7.91	948.82	7.13	949.60	7.43	949.30	8.70	948.03
MW-19	1997?	Unconfined	Glacial Till, Morgan Member?	951.66	954.31	6.64	947.67	9.68	944.63	8.88	945.43	9.76	944.55	11.16	943.15	9.27	945.04	9.00	945.31	9.40	944.91	8.77	945.54	9.04	945.27
MW-20	1997?	Unconfined	Glacial Till, Morgan Member?	954.28	956.66	6.30	950.36	10.78	945.88	10.18	946.48	11.76	944.90	13.83	942.83	10.58	946.08	9.52	947.14	10.24	946.42	10.33	946.33	11.16	945.50
MW-28	1997?	Unconfined	Glacial Till, Morgan Member?	954.7	957.17	4.63	952.54	4.80	952.37	4.71	952.46	4.96	952.21	4.54	952.63	4.69	952.48	4.87	952.30	4.66	952.51	4.73	952.44	4.99	952.18
MW-29	1997?	Unconfined	Glacial Till, Morgan Member?	953.1	955.57	4.88	950.69	5.70	949.87	5.62	949.95	6.18	949.39	5.34	950.23	5.67	949.90	5.74	949.83	5.46	950.11	5.86	949.71	6.11	949.46
MW-31	1997?	Unconfined	Glacial Till, Morgan Member?	951.26	953.60	5.79	947.81	6.63	946.97	6.61	946.99	6.59	947.01	6.17	947.43	6.23	947.37	6.36	947.24	6.63	946.97	6.75	946.85	6.76	946.84
MW-33	10/27/05	Unconfined	Glacial Till, Morgan Member?	949.47	951.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.72	943.95
MW-34	09/02/10	Unconfined	Glacial Till, Morgan Member	949.25	951.80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PZ-1	1997?	Unconfined	Glacial Till, Morgan Member?	951.59	953.81	4.82	948.99	8.22	945.59	7.97	945.84	9.30	944.51	7.73	946.08	8.14	945.67	7.97	945.84	7.40	946.41	7.61	946.20	7.66	946.15
PZ-2	1997?	Unconfined	Glacial Till, Morgan Member?	948.9	951.42	3.46	947.96	10.00	941.42	9.16	942.26	11.36	940.06	12.15	939.27	9.75	941.67	9.06	942.36	9.53	941.89	9.00	942.42	10.04	941.38
MW-R2D	1997?	Confined	Glacial Till, Alden Member?	967.9	970.41	9.88	960.53	8.57	961.84	8.68	961.73	9.38	961.03	8.86	961.55	8.94	961.47	8.91	961.50	8.52	961.89	8.79	961.62	9.69	960.72
MW-R17	1997?	Confined	Glacial Till, Alden Member?	963.3	965.77	21.52	944.25	22.98	942.79	22.20	943.57	21.98	943.79	23.60	942.17	22.69	943.08	22.47	943.30		--	23.22	942.55	23.51	942.26
MW-R30	1997?	Confined	Glacial Till, Alden Member?	956.51	958.21	8.06	950.15	11.16	947.05	10.48	947.73	10.86	947.35	10.69	947.52	10.50	947.71	10.18	948.03	10.41	947.80	10.43	947.78	10.61	947.60
MW-32	1997?	Confined	Glacial Till, Alden Member?	951.77	954.16	10.07	944.09	11.26	942.90	11.08	943.08	14.12	940.04	10.91	943.25	10.93	943.23	10.85	943.31	10.78	943.38	10.97	943.19	10.98	943.18

Notes:
Ground surface elevations are estimated except where reported to nearest 0.01 ft per FGA field notes from 10/20/10 or surface shots using level

Table 3
Groundwater Elevation Measurements
Sauer Danfoss
2800 East 13th Street
Ames, Iowa

Well ID	Date Installed	Groundwater Interval	Approximate Stratigraphic Unit Screened	Ground (ft ASL)	TOC (ft ASL)	Depth to Water (ft)	Groundwater Elevation (ft ASL)	Depth to Water (ft)	Groundwater Elevation (ft ASL)	Depth to Water (ft)	Groundwater Elevation (ft ASL)	Depth to Water (ft)	Groundwater Elevation (ft ASL)	Depth to Water (ft)	Groundwater Elevation (ft ASL)	Depth to Water (ft)	Groundwater Elevation (ft ASL)	Depth to Water (ft)	Groundwater Elevation (ft ASL)
						11/13/06		10/08/07		10/27/08		10/15/09		09/01/10		09/02/10		10/20/10	
MW-1	1997?	Unconfined	Glacial Till, Morgan Member?	971.2	973.71		abandoned		abandoned		abandoned		abandoned		abandoned		abandoned		abandoned
MW-R2S	1997?	Unconfined	Glacial Till, Morgan Member?	968.0	970.49	8.28	962.21	8.15	962.34	7.55	962.94	8.08	962.41	--	--	--	--	8.44	962.05
MW-3	1997?	Unconfined	Glacial Till, Morgan Member?	966.6	969.05		abandoned		abandoned		abandoned		abandoned		abandoned		abandoned		abandoned
MW-4	1997?	Unconfined	Glacial Till, Morgan Member?	967.9	970.39		abandoned		abandoned		abandoned		abandoned		abandoned		abandoned		abandoned
MW-5	1997?	Unconfined	Glacial Till, Morgan Member?	963.3	965.82	7.31	958.51	7.16	958.66	7.52	958.30	8.38	957.44	--	--	--	--	7.30	958.52
MW-R6S	1997?	Unconfined	Glacial Till, Morgan Member?	962.9	965.39	7.47	957.92	7.09	958.30	7.69	957.70	8.54	956.85	--	--	--	--	7.50	957.89
MW-10	1997?	Unconfined	Glacial Till, Morgan Member?	961.64	964.22	8.65	955.57	9.29	954.93	9.10	955.12	10.10	954.12	7.62	956.60	--	--	8.75	955.47
MW-11	1997?	Unconfined	Glacial Till, Morgan Member?	960.72	963.26	10.97	952.29	11.70	951.56	963.35	-0.09	12.36	950.90	--	--	--	--	10.66	952.60
MW-12	1997?	Unconfined	Glacial Till, Morgan Member?	957.20	959.70	19.76	939.94	20.51	939.19	19.82	939.88	21.65	938.05	--	--	--	--	15.59	944.11
MW-R13	1997?	Unconfined	Glacial Till, Morgan Member and Alden Member?	963.74	965.67	7.88	957.79	8.45	957.22	7.99	957.68	9.73	955.94	6.80	958.87	6.88	958.79	8.00	957.67
MW-R14	1997?	Unconfined	Glacial Till, Morgan Member?	963.3	965.83	10.90	954.93	11.65	954.18	10.77	955.06	12.55	953.28	9.34	956.49	--	--	10.08	955.75
MW-15	1997?	Unconfined	Glacial Till, Morgan Member?	955.09	957.99	6.70	951.29	7.53	950.46	6.47	951.52	8.21	949.78	--	--	--	--	6.07	951.92
MW-16	1997?	Unconfined	Glacial Till, Morgan Member?	963.4	965.90	11.39	954.51	11.76	954.14	10.50	955.40	12.94	952.96	--	--	--	--	10.18	955.72
MW-18	1997?	Unconfined	Glacial Till, Morgan Member?	953.86	956.73	7.07	949.66	7.43	949.30	6.06	950.67	17.12	939.61	--	--	--	--	8.02	948.71
MW-19	1997?	Unconfined	Glacial Till, Morgan Member?	951.66	954.31	8.76	945.55	8.51	945.80	7.99	946.32	8.73	945.58	--	--	--	--	8.72	945.59
MW-20	1997?	Unconfined	Glacial Till, Morgan Member?	954.28	956.66	9.12	947.54	10.10	946.56	9.43	947.23	10.78	945.88	--	--	--	--	9.22	947.44
MW-28	1997?	Unconfined	Glacial Till, Morgan Member?	954.7	957.17	4.23	952.94	4.27	952.90	5.11	952.06	5.48	951.69	--	--	--	--	5.02	952.15
MW-29	1997?	Unconfined	Glacial Till, Morgan Member?	953.1	955.57	4.94	950.63	--	--	--	--	--	--	--	--	--	--	--	--
MW-31	1997?	Unconfined	Glacial Till, Morgan Member?	951.26	953.60	6.61	946.99	6.48	947.12	6.79	946.81	6.75	946.85	--	--	--	--	6.60	947.00
MW-33	10/27/05	Unconfined	Glacial Till, Morgan Member?	949.47	951.67	5.15	946.52	4.39	947.28	4.12	947.55	5.70	945.97	--	--	--	--	5.53	946.14
MW-34	09/02/10	Unconfined	Glacial Till, Morgan Member	949.25	951.80	--	--	--	--	--	--	--	--	--	--	--	--	8.52	943.28
PZ-1	1997?	Unconfined	Glacial Till, Morgan Member?	951.59	953.81	6.88	946.93	7.20	946.61	7.55	946.26	10.86	942.95	--	--	--	--	8.23	945.58
PZ-2	1997?	Unconfined	Glacial Till, Morgan Member?	948.9	951.42	7.81	943.61	9.79	941.63	8.07	943.35	--	--	--	--	--	--	--	--
MW-R2D	1997?	Confined	Glacial Till, Alden Member?	967.9	970.41	8.72	961.69	8.85	961.56	8.20	962.21	8.64	961.77	--	--	--	--	8.83	961.58
MW-R17	1997?	Confined	Glacial Till, Alden Member?	963.3	965.77	23.58	942.19	22.55	943.22	22.63	943.14	22.65	943.12	--	--	--	--	22.09	943.68
MW-R30	1997?	Confined	Glacial Till, Alden Member?	956.51	958.21	9.81	948.40	10.17	948.04	10.58	947.63	12.75	945.46	--	--	--	--	11.03	947.18
MW-32	1997?	Confined	Glacial Till, Alden Member?	951.77	954.16	10.54	943.62	10.67	943.49	10.79	943.37	12.65	941.51	--	--	--	--	11.74	942.42

Notes:
Ground surface elevations are estimated except where reported to nearest 0.01 ft per FGA field notes from 10/20/10 or surface shots using level

Table 4

Slug Test Results Summary

Table 4
Slug Test Results Summary
Sauer Danfoss
2800 East 13th Street
Ames, Iowa

Monitoring Well	Static Water Level (ft)	Static Water Column Height (ft)	Saturated Thickness (ft)	Wellbore Radius (ft)	Aquifer Type	Solution Method	y0 (ft)	Shape Factor	K (cm/sec)
MW-10	7.62	5.03	10.1*	0.34*	Unconfined	Bouwer-Rice	0.9064	1.432	2.515E-04
MW-R13	6.80	16.22	12.2*	0.34*	Unconfined	Bouwer-Rice	0.7721	2.85	6.254E-05
MW-R14	9.34	8.70	9.7*	0.34*	Unconfined	Bouwer-Rice	0.7679	2.292	1.04E-03

Notes:
* Estimated

Table 5

Biological and Chemical Measurements

Table 5
Biological and Chemical Measurements
Sauer Danfoss
2800 East 13th Street
Ames, Iowa

Monitoring Well (MW) or Soil Boring (B)	Date Measured	Time Measured or Sampled	Temp (°C)	pH	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	Turbidity (NTU)	Alkalinity (total, $CaCO_3$) (mg/L equivalent)	Nitrate (NO_3^-) (mg/L equivalent)	Nitrite (NO_2^-) (mg/L equivalent)	Sulfate (SO_4^{2-}) (mg/L equivalent)	Sulfite (SO_3^{2-}) (mg/L equivalent)	Total Organic Carbon (mg/L equivalent)
MW-10	11/15/06	10:28	8.49	6.69	1.66	0.63	37	0.216	NM	NM	NM	NM	NM	NM
MW-10	10/30/08	11:40	14.51	7.07	1.382	0.18	104	0.23	NM	NM	NM	NM	NM	NM
MW-10	10/20/10	15:54	15.06	7.25	1.500	0.27	NM	1.18	NM	NM	NM	NM	NM	NM
MW-11	11/15/06	13:33	11.21	6.43	1.456	0.39	47	13.5	NM	NM	NM	NM	NM	NM
MW-11	10/30/08	13:21	12.81	6.40	1.163	0.52	110	3.01	NM	NM	NM	NM	NM	NM
MW-11	10/20/10	15:13	15.40	7.00	1.127	0.38	NM	33.6	NM	NM	NM	NM	NM	NM
MW-12	11/15/06	14:31	9.70	7.04	0.793	1.75	119	15.6	NM	NM	NM	NM	NM	NM
MW-12	10/09/07	09:49	16.73	7.15	0.739	2.62	225	2.86	NM	NM	NM	NM	NM	NM
MW-12	10/27/08	16:49	9.96	6.53	0.735	1.40	188	4.48	NM	NM	NM	NM	NM	NM
MW-12	10/20/10	14:37	14.72	7.55	0.715	0.95	NM	2.01	NM	NM	NM	NM	NM	NM
MW-R13	11/14/06	17:54	5.03	6.61	1.157	2.06	216	2.87	NM	NM	NM	NM	NM	NM
MW-R13	10/31/08	12:39	17.90	7.30	1.129	0.45	196	1.73	NM	NM	NM	NM	NM	NM
MW-R13	10/20/10	11:47	15.77	7.26	1.317	0.70	NM	17.0	NM	NM	NM	NM	NM	NM
B-1 / 6'-7'	09/02/10	09:08	NM	7.60	NM	NM	NM	NM	8.9	0.9	0.9	17	7	2,411
B-2 / 6'-7'	09/02/10	08:58	NM	7.50	NM	NM	NM	NM	10.6	1.0	0.9	21	9	236
B-4 / 6'-7'	09/02/10	12:44	NM	8.40	NM	NM	NM	NM	29.8	0.7	0.7	15	6	1,880
MW-18	11/15/06	16:44	11.12	6.75	1.065	3.12	120	2.67	NM	NM	NM	NM	NM	NM
MW-18	10/09/07	16:07	15.78	7.00	1.081	0.31	102	1.13	NM	NM	NM	NM	NM	NM
MW-18	10/29/08	11:19	12.71	6.92	1.055	0.64	35	1.94	NM	NM	NM	NM	NM	NM
MW-18	10/20/10	14:06	16.42	7.43	1.193	1.20	NM	8.4	NM	NM	NM	NM	NM	NM
MW-19	11/17/06	10:17	11.84	6.75	1.012	1.55	37	95.0	NM	NM	NM	NM	NM	NM
MW-19	10/10/07	11:16	13.27	7.15	0.985	0.27	218	40.0	NM	NM	NM	NM	NM	NM
MW-19	10/29/08	14:37	13.70	6.96	0.853	0.17	67	17.10	NM	NM	NM	NM	NM	NM
MW-19	10/20/10	13:34	17.10	7.35	0.867	0.80	NM	316	NM	NM	NM	NM	NM	NM
MW-20	11/17/06	12:28	10.96	6.71	1.260	2.52	76	58.7	NM	NM	NM	NM	NM	NM
MW-20	10/10/07	13:29	14.17	6.84	1.235	0.35	23	4.03	NM	NM	NM	NM	NM	NM
MW-20	10/30/08	16:06	16.20	7.03	1.088	0.53	149	3.40	NM	NM	NM	NM	NM	NM
MW-20	10/20/10	12:50	16.33	7.24	1.164	0.73	NM	47.1	NM	NM	NM	NM	NM	NM
[redacted]														
MW-R30	11/14/06	14:48	11.30	7.12	0.798	0.16	-32	54.3	NM	NM	NM	NM	NM	NM
MW-R30	10/09/07	13:05	13.63	7.70	0.743	1.04	40	12.4	NM	NM	NM	NM	NM	NM
MW-R30	10/29/08	16:40	12.37	7.33	0.703	0.37	30	20.30	NM	NM	NM	NM	NM	NM
MW-R30	10/20/10	09:11	10.55	7.24	0.818	0.89	NM	38.1	NM	NM	NM	NM	NM	NM
[redacted]														
MW-31	11/13/06	17:43	12.87	6.68	0.958	0.16	189	7.45	NM	NM	NM	NM	NM	NM
MW-31	10/08/07	17:48	17.27	7.05	1.071	0.19	65	3.05	NM	NM	NM	NM	NM	NM
MW-31	10/27/08	14:49	12.98	6.57	5.950	0.36	105	15.80	NM	NM	NM	NM	NM	NM
MW-31	10/20/10	10:07	13.92	7.16	2.330	0.69	NM	535	NM	NM	NM	NM	NM	NM
[redacted]														
MW-32	11/14/06	11:23	7.71	7.05	0.662	2.89	248	29.6	NM	NM	NM	NM	NM	NM
MW-32	10/28/08	11:13	8.35	6.72	0.647	1.90	-35	10.10	NM	NM	NM	NM	NM	NM
MW-32	10/20/10	09:46	12.33	7.43	0.680	0.60	NM	66.8	NM	NM	NM	NM	NM	NM
MW-33	11/13/06	15:16	12.56	7.16	1.120	1.57	248	21.9	NM	NM	NM	NM	NM	NM
MW-33	10/08/07	16:03	21.33	7.14	1.043	0.80	200	222	NM	NM	NM	NM	NM	NM
MW-33	10/28/08	15:16	13.54	7.37	0.971	2.56	104	57.10	NM	NM	NM	NM	NM	NM
MW-33	10/20/10	16:51	16.45	7.38	0.959	0.31	NM	104	NM	NM	NM	NM	NM	NM
MW-34	10/20/10	11:10	16.51	7.13	1.670	0.77	NM	964	NM	NM	NM	NM	NM	NM

Notes:
NM = Not Measured

Table 6

Proposed Monitoring Schedule

Table 6
Proposed Monitoring Schedule
Sauer Danfoss
2800 East 13th Street
Ames, Iowa

Monitoring Well (MW) or Soil Boring (B)	VOCs (mg/L or mg/kg-dry)	1,4-Dioxane (mg/L or mg/kg-dry)	pH	Specific Conductance (mS/cm)	Temp (°C)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Sulfate (mg/L)
*MW-10	X	X	X	X	X	X	X	X
*MW-R13	X	X	X	X	X	X	X	X
*MW-R14	X	X	X	X	X	X	X	X
**B-1R @ 6-7	X	X	X	--	--	--	--	--
**B-2R @ 6-7	X	X	X	--	--	--	--	--
**B-2R @ 19-20	X	X	X	--	--	--	--	--
**B-2R @ 20-22	X	X	X	--	--	--	--	--
**B-3R @ 6-7	X	X	X	--	--	--	--	--
**B-3R @ 19	X	X	X	--	--	--	--	--
**B-3R @ 20-22	X	X	X	--	--	--	--	--
**B-4R @ 6-7	X	X	X	--	--	--	--	--

Notes:
*Groundwater samples collected approximately 1 month and 3 months post injection, and during annual sampling in October
**Soil confirmation samples to be collected once groundwater concentrations < MCL
VOC list includes Acetone, 1,1-DCA, 1,2-DCA, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, Methylene Chloride, PCE, 1,1,1-TCA, 1,1,2-TCA, TCE, Vinyl Chloride, and Xylene (total) by SW-846 Method 8260
1,4-Dioxane by SW-846 Method 8260B-SIM
Soil samples collected per SW-846 Method 5035
Duplicate sample to also be collected at one soil boring

APPENDICES

Appendix A

Soil Boring Logs/Monitoring Well Diagrams

Fehr-Graham & Associates
1920 Daimler Rd.
Rockford, IL 61108

BORING NUMBER B-1

CLIENT Sauer Danfoss
PROJECT NAME Sauer Danfoss
PROJECT NUMBER 10-500
PROJECT LOCATION Ames, Iowa
DATE STARTED 9/2/10 **COMPLETED** 9/2/10
GROUND ELEVATION ___ **HOLE SIZE** 2"
DRILLING CONTRACTOR Saberprobe LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe 6610 DT- Macro-Core Sampler
▽ **AT TIME OF DRILLING** 7.0 ft
LOGGED BY Jeff Ogden **CHECKED BY** Jeff Ogden
AT END OF DRILLING ---
NOTES Approx. 10' East of MW-R13
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
5	MC 1	100	Sampled at 6'-7'	CL-ML		Dark gray to black silty lean clay, dry to damp, unoxidized, unleached to leached, massive, cohesive, firm, horizontal fractures throughout, root material	0.0 0.0 0.0 0.0 0.0
10	MC 2	100		CL-ML		6.0 7.0 ▽ Gray silty lean clay with fine to coarse sand, subangular to subrounded in silt/clay matrix, cohesive, unleached, oxidized to unoxidized, damp, some rust-colored mottling, firm Gray to brown silty lean clay, includes sand, fine to coarse grained, subangular to subrounded, massive, unleached, cohesive, oxidized, damp to moist, soft to firm. Groundwater assumed at 7'	0.0 0.0 0.0 0.0 0.0
15	MC 3	100		CL-ML		Few horizontal fractures throughout from 10' - 15' Wet at 15'	0.0 0.0 0.0 0.0 0.0
20	MC 4	100		CL-ML		19.5 20.0 Gray silty lean clay, firm, massive, unleached, unoxidized, few to some fine to coarse grained sand in silt/clay matrix, subangular to subrounded, damp to dry, firm to hard Bottom of hole at 20.0 feet.	0.0 0.0 0.0 0.0 0.0

Fehr-Graham & Associates
1920 Daimler Rd.
Rockford, IL 61108

BORING NUMBER B-2

CLIENT Sauer Danfoss
PROJECT NAME Sauer Danfoss
PROJECT NUMBER 10-500
PROJECT LOCATION Ames, Iowa
DATE STARTED 9/2/10 COMPLETED 9/2/10
GROUND ELEVATION ____ HOLE SIZE 2"
DRILLING CONTRACTOR Saberprobe LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe 6610 DT- Macro-Core Sampler
▽ AT TIME OF DRILLING 8.0 ft
LOGGED BY Jeff Ogden CHECKED BY Jeff Ogden
AT END OF DRILLING —
NOTES Approx. 10' North of MW-R13
AFTER DRILLING —

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
5	MC 1	100		CL-ML		Dark gray to black silty lean clay, dry to damp, unoxidized, unleached to leached, massive, cohesive, firm, horizontal fractures throughout, root material	0.0 0.0 0.0 0.0 0.0
						6.0	0.0
10	MC 2	100	Sampled at 6'-7'	CL-ML		Gray silty lean clay with fine to coarse grained sand, subangular to subrounded, in silt/clay matrix, cohesive, few horizontal fractures, unleached, oxidized to unoxidized, damp, some rust-colored mottling, firm to leached	0.0 0.0
						8.0 ▽	
				CL-ML		8.5 Brown to gray silty lean clay, includes sand to fine to coarse grained, subangular to subrounded, massive, unleached, cohesive, oxidized, damp to moist, soft to firm	0.0
				SP-SW		8.6 Groundwater assumed at 8'	
						10.0 Brown fine to medium grained sand, wet, loose	
15	MC 3	20		CL-ML		Brown to gray silty lean clay, includes sand to fine to coarse grained, subangular to subrounded, massive, unleached, cohesive, oxidized, damp to moist, soft to firm	
						No recovery. Per driller, all sand and gravel	
						14.0	0.0
				CL-ML		15.0 Brown lean clay with silt to silty lean clay, wet, few to some fine to coarse sand, subangular to subrounded, in silt/clay matrix, leached to unleached, oxidized, cohesive to non-cohesive, soft to firm	
20	MC 4	20	Sampled at 19'-20'			No recovery to 19'. Per driller all sand and gravel. Sand below water table will not stay in sampler	
						19.0	7.0
				CL-ML		20.0 Gray silty lean clay, firm to hard, massive, unleached, unoxidized, few to some fine to coarse grained sand in silt/clay matrix, subangular to subrounded, dry to damp	
						Bottom of hole at 20.0 feet.	

BORING NUMBER B-3

Fehr-Graham & Associates
1920 Daimler Rd.
Rockford, IL 61108

CLIENT Sauer Danfoss
PROJECT NAME Sauer Danfoss
PROJECT NUMBER 10-500
PROJECT LOCATION Ames, Iowa
DATE STARTED 9/2/10 **COMPLETED** 9/2/10
GROUND ELEVATION _____ **HOLE SIZE** 2"
DRILLING CONTRACTOR Saberprobe LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe 6610 DT- Macro-Core Sampler
▽ **AT TIME OF DRILLING** 7.0 ft
LOGGED BY Jeff Ogden **CHECKED BY** Jeff Ogden
AT END OF DRILLING —
NOTES Approx. 10' West of MW-R13
AFTER DRILLING —

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
5	MC 1	100	Sampled at 6'-7', field duplicate	CL-ML		Dark gray to black silty lean clay, dry to damp, unoxidized, unleached to leached, massive, cohesive with horizontal fractures throughout, firm, root material	0.0 0.0 0.0 0.0 0.0
10	MC 2	100		CL-ML		5.5 Gray silty lean clay with fine to coarse grained sand, subangular to subrounded, in silt/clay matrix, cohesive, unleached, oxidized to unoxidized, damp, some rust-colored mottling, firm 7.0 ▽ Gray to brown silty lean clay, includes sand to fine to coarse grained, subangular to subrounded, massive, unleached, cohesive, oxidized, damp to moist, soft to firm Groundwater assumed at 7'	0.0 0.0 0.0 0.0 0.0
15	MC 3	100		CL-ML		Few horizontal fractures throughout from 10' - 15'	0.0 0.0 0.0 0.0 0.0
20	MC 4	100	Sample at 19'	SP-SW		19.0 19.5 Brown fine to medium grained sand, wet, dense, odor?	0.0 0.0 0.0 21.7 0.0
				CL-ML		20.0 Gray silty lean clay, massive, unleached, unoxidized, few to some fine to coarse grained sand in silt/clay matrix, subangular to subrounded, firm to hard, dry to damp, cohesive Bottom of hole at 20.0 feet.	

Fehr-Graham & Associates
1920 Daimler Rd.
Rockford, IL 61108

BORING NUMBER B-4

CLIENT Sauer Danfoss
PROJECT NAME Sauer Danfoss
PROJECT NUMBER 10-500
PROJECT LOCATION Ames, Iowa
DATE STARTED 9/2/10 **COMPLETED** 9/2/10
GROUND ELEVATION _____ **HOLE SIZE** 2"
DRILLING CONTRACTOR Saberprobe LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe 6610 DT- Macro-Core Sampler
▽ **AT TIME OF DRILLING** 8.0 ft
LOGGED BY Jeff Ogden **CHECKED BY** Jeff Ogden
AT END OF DRILLING —
NOTES Approx. 10' South of MW-R13
AFTER DRILLING —

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
						0.5 Grass, no recovery	0.0
5	MC 1	90	Sampled at 6'-7'	CL-ML		Dark gray to black silty lean clay, dry to damp, unoxidized, unleached, massive, cohesive with horizontal fractures throughout, firm	0.0 0.0 0.0 0.0
						5.5	0.0
10	MC 2	70		CL-ML		6.5 Gray to green silty lean clay, reduced, with some fine to coarse grained sand, subangular to subrounded, in silt/clay matrix, cohesive, unleached, damp, firm	0.0
				CL-ML		8.0 ▽ Brown to grayish silty lean clay, includes sand to fine to coarse grained, subangular to subrounded, massive, unleached, oxidized, damp, firm to soft	0.0
						No recovery; wash out sand?	
						9.5	0.0
15	MC 3	100		CL-ML		Brown to grayish silty lean clay, includes sand to fine to coarse grained, subangular to subrounded, massive, unleached, oxidized, damp, firm to soft Few horizontal fractures throughout from 10' - 15'	0.0 0.0 0.0 0.0 0.0
20	MC 4	100				19.0	0.0
				CL-ML		20.0 Gray silty lean clay, firm to hard, massive, unleached, unoxidized, few to some fine to coarse sand in silt/clay matrix, subangular to subrounded, dry to damp, cohesive, few horizontal fractures throughout	0.0
						Bottom of hole at 20.0 feet.	

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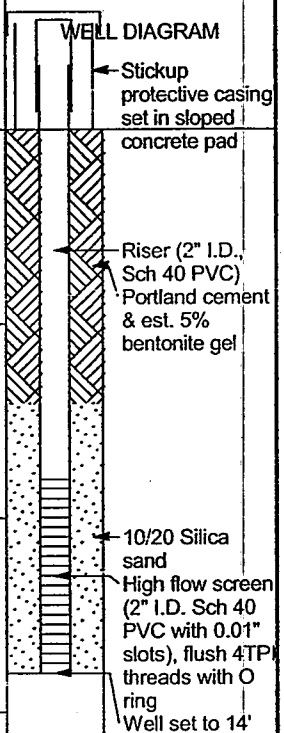
Rockford, IL 61108

WELL NUMBER MW-34

CLIENT Sauer Danfoss
PROJECT NAME Sauer Danfoss
PROJECT NUMBER 10-500
PROJECT LOCATION Ames, Iowa
DATE STARTED 9/2/10 **COMPLETED** 9/2/10
GROUND ELEVATION 949.25 ft **HOLE SIZE** 8.25" O.D.
DRILLING CONTRACTOR Saberprobe LLC
GROUND WATER LEVELS:
DRILLING METHOD Geoprobe 6610 DT- Macro-Core Sampler
▽ **AT TIME OF DRILLING** 6.0 ft / Elev 943.3 ft
LOGGED BY Jeff Ogden **CHECKED BY** Jeff Ogden
AT END OF DRILLING —
NOTES Near SW corner of property
AFTER DRILLING 8.52' (from TOC on 10/20/10)

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION		PID (ppm)
5	MC 1	100	CL-ML		Dark gray to black to brown silty lean clay, dry to damp, unoxidozed, unleached to leached, massive, cohesive with horizontal fractures throughout, firm Moist at 5'		0.0 0.0 0.0 0.0 0.0
10	MC 2	60	CL-ML		6.0 ▽	943.3	0.0 0.0 0.0
					Green to grayish silty lean clay, reduced, with some fine to coarse grained sand, subangular to subrounded, in silt/clay matrix, cohesive, leached, moist to wet, soft		
					8.0	941.3	
					Assumed groundwater at 6'		
					No recovery. Per driller, groundwater at 9' as augers spinning up flowing sand		
					10.0	939.3	
15	MC 3	40	CL-ML		Gray silty lean clay with fine to coarse grained sand, subangular to subrounded, in silt/clay matrix, wet, soft to firm, cohesive, some rust-colored mottling, unoxidized to oxidized, unleached		0.0 0.0
					12.0	937.3	
					No recovery		
					15.0	934.3	
20	MC 4	100	CL-ML		Gray silty lean clay with fine to coarse grained sand, subangular to subrounded, in silt/clay matrix, damp, soft to firm, cohesive, some rust-colored mottling, unoxidized to oxidized, unleached		0.0 0.0
					16.5	932.8	
			SP		Gray to brown fine grained sand, loose, damp		0.0 0.0
					19.0	930.3	0.0
			CL-ML		20.0	929.3	
					Gray silty lean clay, massive, unleached, unoxidized, few to some fine to coarse grained sand, subangular to subrounded in silt/clay matrix, firm to hard, dry to damp, cohesive		
					Bottom of hole at 20.0 feet.		

WELL DIAGRAM



Appendix B

Laboratory Analytical Reports

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

704 Enterprise Drive Cedar Falls, IA 50613 * 800-750-2401 * Fax 319-277-2425

September 27, 2010

Client:
FEHR-GRAHAM & ASSOCIATES - ROCKFORD
1920 Daimler Rd
Rockford, IL 611112

Work Order: CTI0218
Project Name: Sauer Danfoss Soil Sampling
Project Number: 10-500

Attn: Erin Jarrett

Date Received: 09/02/10

The Chain(s) of Custody, 2 pages, are included and are an integral part of this report.

If you have any questions relating to this analytical report, please contact your Laboratory Project Manager at 1-(800)750-2401

SAMPLE IDENTIFICATION	LAB NUMBER	COLLECTION DATE AND TIME
27860 B-1 6-7'	CTI0218-01	09/02/10 09:08
27861 B-2 6-7'	CTI0218-02	09/02/10 09:58
27862 B-2 19-20'	CTI0218-03	09/02/10 10:20
27863 B-3 6-7'	CTI0218-04	09/02/10 10:51
27864 B-3 6-7' Dup	CTI0218-05	09/02/10 10:51
27867 B-4 6-7'	CTI0218-06	09/02/10 12:44
27868 B-3 19'	CTI0218-07	09/02/10 11:10
27869 Trip Blank	CTI0218-08	09/02/10

SW 9030A, SW 9060 Mod analysis performed at TestAmerica Nashville - Lab ID: 131

Case Narrative:

P2 – The laboratory reagent water was added to a sub sample soil. The resulting pH of the solution after mixing was outside of the method specifications. The laboratory adjusted the pH within method specifications prior to analysis.

H3 – The holding time for this analyte exceed method specifications (Analyze immediately)

RL1 – The reporting limit was elevated to minimize a matrix problem that was observed during analysis.

CIN – The response factor used in result determination was outside of method control (<15%) for 1,1,1-Trichloroethane (17.5%). The average of all calibrated compounds was less than <15% demonstrating the overall system had reasonable linearity.

Samples were received into laboratory at a temperature of 0.90 °C.

NELAC states that samples which require thermal preservation shall be considered acceptable if the arrival temperature is within 2 degrees C of the required temperature or the method specified range. For samples with a temperature requirement of 4 degrees C, an arrival temperature from 0 degrees C to 6 degrees C meets specifications. Samples that are delivered to the laboratory on the same day that they are collected may not meet these criteria. In these cases, the samples are considered acceptable if there is evidence that the chilling process has begun, such as arrival on ice.

Please refer to the Temperature and Sample Receipt form that is included with this report for additional information regarding the condition of samples at the time of receipt by the laboratory.

The reported results were obtained in compliance with the 2003 NELAC standards unless otherwise noted.

TestAmerica Cedar Falls
Derrick Klinkenberg
Organics Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

704 Enterprise Drive Cedar Falls, IA 50613 * 800-750-2401 * Fax 319-277-2425

FEHR-GRAHAM & ASSOCIATES - ROCKFORD
1920 Daimler Rd
Rockford, IL 611112
Erin Jarrett

Work Order: CTI0218
Project: Sauer Danfoss Soil Sampling
Project Number: 10-500

Received: 09/02/10
Reported: 09/27/10 15:14

TestAmerica Laboratories, Inc. certifies that the analytical results contained herein apply only to the specific sample analyzed.

Approved By:

TestAmerica Cedar Falls
Derrick Klinkenberg
Organics Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
704 Enterprise Drive Cedar Falls, IA 50613 * 800-750-2401 * Fax 319-277-2425

FEHR-GRAHAM & ASSOCIATES - ROCKFORD
1920 Daimler Rd
Rockford, IL 611112
Erin Jarrett

Work Order: CTI0218
Project: Sauer Danfoss Soil Sampling
Project Number: 10-500

Received: 09/02/10
Reported: 09/27/10 15:14

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Quan. Limit	Dilution Factor	Date Analyzed	Analyst	Seq/ Batch	Method
Sample ID: CTI0218-01 (27860 B-1 6-7' - Soil)					**Sampled: 09/02/10 09:08**		**Recvd: 09/02/10 19:15**		
General Chemistry Parameters									
% Solids	85.3		%	0.100	1	09/03/10 15:14	mrh	10I0186	SM 2540 G
Alkalinity, Total (CaCO3)	60.4		mg/kg dry	58.6	0.999	09/14/10 16:19	tlr	10I0613	SM 2320 B
Chromium, Hexavalent	<3.52		mg/kg dry	3.52	0.983	09/08/10 12:10	mdk	10I0342	SW 7196A
Nitrate as N	<5.86		mg/kg dry	5.86	0.987	09/07/10 17:30	jmh	10I0261	SW 9210A
Nitrite as N	<5.86	P2	mg/kg dry	5.86	0.99	09/08/10 14:00	mdk	10I0348	SM 4500 NO3 E/00
pH	7.60	H3	pH Units	0.100	1	09/10/10 11:40	sas	10I0428	SW 9045D
Sulfate	<117	RL1	mg/kg dry	117	9.95	09/17/10 17:08	tlr	10I0820	SW 9056
Total Metals by SW 846 Series Methods									
Arsenic	5.47		mg/kg dry	1.17	1	09/14/10 11:30	lbb	10I0303	SW 7060A
Barium	64.3		mg/kg dry	0.586	0.99	09/09/10 21:12	cjt	10I0371	SW 6010B
Cadmium	<1.17		mg/kg dry	1.17	0.99	09/09/10 21:12	cjt	10I0371	SW 6010B
Chromium	17.3		mg/kg dry	1.17	0.99	09/09/10 21:12	cjt	10I0371	SW 6010B
Copper	11.2		mg/kg dry	1.17	0.99	09/09/10 21:12	cjt	10I0371	SW 6010B
Iron	15600		mg/kg dry	5.86	0.99	09/09/10 21:12	cjt	10I0371	SW 6010B
Lead	7.01		mg/kg dry	5.86	0.99	09/09/10 21:12	cjt	10I0371	SW 6010B
Mercury	0.0251		mg/kg dry	0.0235	0.95	09/10/10 12:41	kmd	10I0418	SW 7471A
Selenium	<8.80		mg/kg dry	8.80	0.99	09/09/10 21:12	cjt	10I0371	SW 6010B
Silver	<1.17		mg/kg dry	1.17	0.99	09/09/10 21:12	cjt	10I0371	SW 6010B
Volatile Organic Compounds									
Acetone	<51.9		ug/kg dry	51.9	0.886	09/09/10 12:54	EEE	10I0436	SW 8260B
1,1-Dichloroethane	<5.19		ug/kg dry	5.19	0.886	09/09/10 12:54	EEE	10I0436	SW 8260B
1,2-Dichloroethane	<5.19		ug/kg dry	5.19	0.886	09/09/10 12:54	EEE	10I0436	SW 8260B
1,1-Dichloroethene	<5.19		ug/kg dry	5.19	0.886	09/09/10 12:54	EEE	10I0436	SW 8260B
cis-1,2-Dichloroethene	29.4		ug/kg dry	5.19	0.886	09/09/10 12:54	EEE	10I0436	SW 8260B
trans-1,2-Dichloroethene	<5.19		ug/kg dry	5.19	0.886	09/09/10 12:54	EEE	10I0436	SW 8260B
Methylene Chloride	<51.9		ug/kg dry	51.9	0.886	09/09/10 12:54	EEE	10I0436	SW 8260B
Tetrachloroethene	99.0		ug/kg dry	5.19	0.886	09/09/10 12:54	EEE	10I0436	SW 8260B
1,1,1-Trichloroethane	<5.19		ug/kg dry	5.19	0.886	09/09/10 12:54	EEE	10I0436	SW 8260B
1,1,2-Trichloroethane	<5.19		ug/kg dry	5.19	0.886	09/09/10 12:54	EEE	10I0436	SW 8260B
Trichloroethene	<5.19		ug/kg dry	5.19	0.886	09/09/10 12:54	EEE	10I0436	SW 8260B
Vinyl chloride	<15.6		ug/kg dry	15.6	0.886	09/09/10 12:54	EEE	10I0436	SW 8260B
Xylenes, total	<15.6		ug/kg dry	15.6	0.886	09/09/10 12:54	EEE	10I0436	SW 8260B
Surr: Dibromofluoromethane (75-125%)	*104 %*								
Surr: Toluene-d8 (80-120%)	*88 %*								
Surr: 4-Bromofluorobenzene (80-120%)	*103 %*								
General Chemistry Parameters									
Sulfide	<50.0		mg/kg	50.0	1	09/05/10 15:10	JDJ	10I0796	SW846 9030B/9034
Total Organic Carbon	16400		mg/Kg dry	1000	1	09/20/10 10:30	SHJ	10I2801	SW846 9060M
1,4-DIOXANE BY GCMS - SINGLE ION MONITORING (SIM)									
1,4-Dioxane	53		ug/kg dry	12	2.03	09/15/10 12:07	ATL	10I1301	EPA 8260B-SIM
Surr: Dibromofluoromethane (80-125%)	*108 %*								

TestAmerica Cedar Falls
Derrick Klinkenberg
Organics Manager

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FEHR-GRAHAM & ASSOCIATES - ROCKFORD
1920 Daimler Rd
Rockford, IL 611112
Erin Jarrett

Work Order: CTI0218
Project: Sauer Danfoss Soil Sampling
Project Number: 10-500

Received: 09/02/10
Reported: 09/27/10 15:14

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Quan. Limit	Dilution Factor	Date Analyzed	Analyst	Seq/ Batch	Method
Sample ID: CTI0218-01 (27860 B-1 6-7' - Soil) - cont.					**Sampled: 09/02/10 09:08**			**Recvd: 09/02/10 19:15**	
INORGANICS									
Percent Solids	85		%	0.10	1	09/20/10 14:00	DK	10I2074	SM2540B MOD.
Sample ID: CTI0218-02 (27861 B-2 6-7' - Soil)					**Sampled: 09/02/10 09:58**			**Recvd: 09/02/10 19:15**	
General Chemistry Parameters									
% Solids	82.9		%	0.100	1	09/03/10 15:14	mrh	10I0186	SM 2540 G
Alkalinity, Total (CaCO3)	61.9		mg/kg dry	60.3	0.997	09/14/10 16:19	tlr	10I0613	SM 2320 B
Chromium, Hexavalent	<3.12		mg/kg dry	3.12	0.861	09/08/10 12:10	mdk	10I0342	SW 7196A
Nitrate as N	<6.03		mg/kg dry	6.03	0.99	09/07/10 17:30	jmh	10I0261	SW 9210A
Nitrite as N	<5.19	P2	mg/kg dry	5.19	0.861	09/08/10 14:00	mdk	10I0348	SM 4500 NO3 E/00
pH	7.50	H3	pH Units	0.100	1	09/10/10 11:40	sas	10I0428	SW 9045D
Sulfate	<121	RL1	mg/kg dry	121	9.97	09/17/10 17:08	tlr	10I0820	SW 9056
Total Metals by SW 846 Series Methods									
Arsenic	8.89		mg/kg dry	1.21	0.992	09/14/10 11:33	lbb	10I0303	SW 7060A
Barium	134		mg/kg dry	0.603	0.991	09/09/10 21:16	cjt	10I0371	SW 6010B
Cadmium	<1.21		mg/kg dry	1.21	0.991	09/09/10 21:16	cjt	10I0371	SW 6010B
Chromium	20.1		mg/kg dry	1.21	0.991	09/09/10 21:16	cjt	10I0371	SW 6010B
Copper	15.2		mg/kg dry	1.21	0.991	09/09/10 21:16	cjt	10I0371	SW 6010B
Iron	17600		mg/kg dry	6.03	0.991	09/09/10 21:16	cjt	10I0371	SW 6010B
Lead	6.93		mg/kg dry	6.03	0.991	09/09/10 21:16	cjt	10I0371	SW 6010B
Mercury	0.0324		mg/kg dry	0.0241	0.925	09/10/10 12:42	kmd	10I0418	SW 7471A
Selenium	<9.04		mg/kg dry	9.04	0.991	09/09/10 21:16	cjt	10I0371	SW 6010B
Silver	<1.21		mg/kg dry	1.21	0.991	09/09/10 21:16	cjt	10I0371	SW 6010B
Volatile Organic Compounds									
Acetone	<49.0		ug/kg dry	49.0	0.812	09/09/10 13:24	EEE	10I0436	SW 8260B
1,1-Dichloroethane	<4.90		ug/kg dry	4.90	0.812	09/09/10 13:24	EEE	10I0436	SW 8260B
1,2-Dichloroethane	<4.90		ug/kg dry	4.90	0.812	09/09/10 13:24	EEE	10I0436	SW 8260B
1,1-Dichloroethene	<4.90		ug/kg dry	4.90	0.812	09/09/10 13:24	EEE	10I0436	SW 8260B
cis-1,2-Dichloroethene	58.4		ug/kg dry	4.90	0.812	09/09/10 13:24	EEE	10I0436	SW 8260B
trans-1,2-Dichloroethene	<4.90		ug/kg dry	4.90	0.812	09/09/10 13:24	EEE	10I0436	SW 8260B
Methylene Chloride	<49.0		ug/kg dry	49.0	0.812	09/09/10 13:24	EEE	10I0436	SW 8260B
Tetrachloroethene	266		ug/kg dry	4.90	0.812	09/09/10 13:24	EEE	10I0436	SW 8260B
1,1,1-Trichloroethane	15.5		ug/kg dry	4.90	0.812	09/09/10 13:24	EEE	10I0436	SW 8260B
1,1,2-Trichloroethane	<4.90		ug/kg dry	4.90	0.812	09/09/10 13:24	EEE	10I0436	SW 8260B
Trichloroethene	6.72		ug/kg dry	4.90	0.812	09/09/10 13:24	EEE	10I0436	SW 8260B
Vinyl chloride	<14.7		ug/kg dry	14.7	0.812	09/09/10 13:24	EEE	10I0436	SW 8260B
Xylenes, total	<14.7		ug/kg dry	14.7	0.812	09/09/10 13:24	EEE	10I0436	SW 8260B
Surr: Dibromofluoromethane (75-125%)	*106 %*								
Surr: Toluene-d8 (80-120%)	*90 %*								
Surr: 4-Bromofluorobenzene (80-120%)	*105 %*								
General Chemistry Parameters									
Sulfide	<50.0		mg/kg	50.0	1	09/05/10 15:10	JDJ	10I0796	SW846 9030B/9034

TestAmerica Cedar Falls
Derrick Klinkenberg
Organics Manager

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FEHR-GRAHAM & ASSOCIATES - ROCKFORD
1920 Daimler Rd
Rockford, IL 611112
Erin Jarrett

Work Order: CTI0218
Project: Sauer Danfoss Soil Sampling
Project Number: 10-500

Received: 09/02/10
Reported: 09/27/10 15:14

ANALYTICAL REPORT

Analyte	Result	Data Qualifiers	Units	Quan. Limit	Dilution Factor	Date Analyzed	Analyst	Seq/ Batch	Method
Sample ID: CTI0218-02 (27861 B-2 6-7' - Soil) - cont.					**Sampled: 09/02/10 09:58**		**Recvd: 09/02/10 19:15**		
General Chemistry Parameters - cont.									
Total Organic Carbon	1380		mg/Kg dry	1000	1	09/20/10 10:30	SHJ	10I2801	SW846 9060M
1,4-DIOXANE BY GCMS - SINGLE ION MONITORING (SIM)									
1,4-Dioxane	210		ug/kg dry	6.0	0.99	09/15/10 12:36	ATL	10I1301	EPA 8260B-SIM
Surr: Dibromofluoromethane (80-125%)	*116 %*								
INORGANICS									
Percent Solids	83		%	0.10	1	09/20/10 14:00	DK	10I2074	SM2540B MOD.
Sample ID: CTI0218-03 (27862 B-2 19-20' - Soil)					**Sampled: 09/02/10 10:20**		**Recvd: 09/02/10 19:15**		
General Chemistry Parameters									
% Solids	88.2		%	0.100	1	09/03/10 15:14	mrh	10I0186	SM 2540 G
Volatile Organic Compounds									
Acetone	<42.3		ug/kg dry	42.3	0.747	09/09/10 13:54	EEE	10I0436	SW 8260B
1,1-Dichloroethane	243		ug/kg dry	4.23	0.747	09/09/10 13:54	EEE	10I0436	SW 8260B
1,2-Dichloroethane	<4.23		ug/kg dry	4.23	0.747	09/09/10 13:54	EEE	10I0436	SW 8260B
1,1-Dichloroethene	394		ug/kg dry	4.23	0.747	09/09/10 13:54	EEE	10I0436	SW 8260B
cis-1,2-Dichloroethene	<4.23		ug/kg dry	4.23	0.747	09/09/10 13:54	EEE	10I0436	SW 8260B
trans-1,2-Dichloroethene	<4.23		ug/kg dry	4.23	0.747	09/09/10 13:54	EEE	10I0436	SW 8260B
Methylene Chloride	<42.3		ug/kg dry	42.3	0.747	09/09/10 13:54	EEE	10I0436	SW 8260B
Tetrachloroethene	28.9		ug/kg dry	4.23	0.747	09/09/10 13:54	EEE	10I0436	SW 8260B
1,1,1-Trichloroethane	1600		ug/kg dry	437	77	09/10/10 10:59	EEE	10I0472	SW 8260B
1,1,2-Trichloroethane	35.9		ug/kg dry	4.23	0.747	09/09/10 13:54	EEE	10I0436	SW 8260B
Trichloroethene	<4.23		ug/kg dry	4.23	0.747	09/09/10 13:54	EEE	10I0436	SW 8260B
Vinyl chloride	<12.7		ug/kg dry	12.7	0.747	09/09/10 13:54	EEE	10I0436	SW 8260B
Xylenes, total	<12.7		ug/kg dry	12.7	0.747	09/09/10 13:54	EEE	10I0436	SW 8260B
Surr: Dibromofluoromethane (75-125%)	*104 %*								
Surr: Toluene-d8 (80-120%)	*88 %*								
Surr: 4-Bromofluorobenzene (80-120%)	*104 %*								
Sample ID: CTI0218-04 (27863 B-3 6-7' - Soil)					**Sampled: 09/02/10 10:51**		**Recvd: 09/02/10 19:15**		
General Chemistry Parameters									
% Solids	86.6		%	0.100	1	09/03/10 15:14	mrh	10I0186	SM 2540 G
Volatile Organic Compounds									
Acetone	<45.3		ug/kg dry	45.3	0.785	09/09/10 12:23	EEE	10I0436	SW 8260B
1,1-Dichloroethane	<4.53		ug/kg dry	4.53	0.785	09/09/10 12:23	EEE	10I0436	SW 8260B
1,2-Dichloroethane	<4.53		ug/kg dry	4.53	0.785	09/09/10 12:23	EEE	10I0436	SW 8260B
1,1-Dichloroethene	<4.53		ug/kg dry	4.53	0.785	09/09/10 12:23	EEE	10I0436	SW 8260B
cis-1,2-Dichloroethene	31.3	M1	ug/kg dry	4.53	0.785	09/09/10 12:23	EEE	10I0436	SW 8260B
trans-1,2-Dichloroethene	<4.53		ug/kg dry	4.53	0.785	09/09/10 12:23	EEE	10I0436	SW 8260B
Methylene Chloride	<45.3		ug/kg dry	45.3	0.785	09/09/10 12:23	EEE	10I0436	SW 8260B
Tetrachloroethene	171	M1	ug/kg dry	4.53	0.785	09/09/10 12:23	EEE	10I0436	SW 8260B
1,1,1-Trichloroethane	19.2	M1	ug/kg dry	4.53	0.785	09/09/10 12:23	EEE	10I0436	SW 8260B
1,1,2-Trichloroethane	<4.53		ug/kg dry	4.53	0.785	09/09/10 12:23	EEE	10I0436	SW 8260B
Trichloroethene	5.12		ug/kg dry	4.53	0.785	09/09/10 12:23	EEE	10I0436	SW 8260B

FEHR-GRAHAM & ASSOCIATES - ROCKFORD
1920 Daimler Rd
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Erin Jarrett

Work Order: CTI0218
Project: Sauer Danfoss Soil Sampling
Project Number: 10-500

Received: 09/02/10
Reported: 09/27/10 15:14

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Quan. Limit	Dilution Factor	Date Analyzed	Analyst	Seq/ Batch	Method
Sample ID: CTI0218-04 (27863 B-3 6-7' - Soil) - cont.					**Sampled: 09/02/10 10:51**				**Recvd: 09/02/10 19:15**
Volatile Organic Compounds - cont.									
Vinyl chloride	<13.6		ug/kg dry	13.6	0.785	09/09/10 12:23	EEE	10I0436	SW 8260B
Xylenes, total	<13.6		ug/kg dry	13.6	0.785	09/09/10 12:23	EEE	10I0436	SW 8260B
Surr: Dibromofluoromethane (75-125%)	*104 %*								
Surr: Toluene-d8 (80-120%)	*89 %*								
Surr: 4-Bromofluorobenzene (80-120%)	*105 %*								
1,4-DIOXANE BY GCMS - SINGLE ION MONITORING (SIM)									
1,4-Dioxane	**28**		ug/kg dry	5.4	0.954	09/15/10 13:05	ATL	10I1301	EPA 8260B-SIM
Surr: Dibromofluoromethane (80-125%)	*121 %*								
INORGANICS									
Percent Solids	**88**		%	0.10	1	09/20/10 14:00	DK	10I2074	SM2540B MOD.
Sample ID: CTI0218-05 (27864 B-3 6-7' Dup - Soil)					**Sampled: 09/02/10 10:51**				**Recvd: 09/02/10 19:15**
General Chemistry Parameters									
% Solids	**87.2**		%	0.100	1	09/03/10 15:14	mrh	10I0186	SM 2540 G
Volatile Organic Compounds									
Acetone	<42.4		ug/kg dry	42.4	0.74	09/09/10 14:25	EEE	10I0436	SW 8260B
1,1-Dichloroethane	<4.24		ug/kg dry	4.24	0.74	09/09/10 14:25	EEE	10I0436	SW 8260B
1,2-Dichloroethane	<4.24		ug/kg dry	4.24	0.74	09/09/10 14:25	EEE	10I0436	SW 8260B
1,1-Dichloroethene	**4.57**		ug/kg dry	4.24	0.74	09/09/10 14:25	EEE	10I0436	SW 8260B
cis-1,2-Dichloroethene	**20.5**		ug/kg dry	4.24	0.74	09/09/10 14:25	EEE	10I0436	SW 8260B
trans-1,2-Dichloroethene	<4.24		ug/kg dry	4.24	0.74	09/09/10 14:25	EEE	10I0436	SW 8260B
Methylene Chloride	<42.4		ug/kg dry	42.4	0.74	09/09/10 14:25	EEE	10I0436	SW 8260B
Tetrachloroethene	**170**		ug/kg dry	4.24	0.74	09/09/10 14:25	EEE	10I0436	SW 8260B
1,1,1-Trichloroethane	**23.7**		ug/kg dry	4.24	0.74	09/09/10 14:25	EEE	10I0436	SW 8260B
1,1,2-Trichloroethane	<4.24		ug/kg dry	4.24	0.74	09/09/10 14:25	EEE	10I0436	SW 8260B
Trichloroethene	<4.24		ug/kg dry	4.24	0.74	09/09/10 14:25	EEE	10I0436	SW 8260B
Vinyl chloride	<12.7		ug/kg dry	12.7	0.74	09/09/10 14:25	EEE	10I0436	SW 8260B
Xylenes, total	<12.7		ug/kg dry	12.7	0.74	09/09/10 14:25	EEE	10I0436	SW 8260B
Surr: Dibromofluoromethane (75-125%)	*104 %*								
Surr: Toluene-d8 (80-120%)	*87 %*								
Surr: 4-Bromofluorobenzene (80-120%)	*105 %*								
Sample ID: CTI0218-06 (27867 B-4 6-7' - Soil)					**Sampled: 09/02/10 12:44**				**Recvd: 09/02/10 19:15**
General Chemistry Parameters									
% Solids	**87.3**		%	0.100	1	09/03/10 15:14	mrh	10I0186	SM 2540 G
Alkalinity, Total (CaCO3)	**235**		mg/kg dry	57.3	0.996	09/14/10 16:19	tlr	10I0613	SM 2320 B
Chromium, Hexavalent	<3.44		mg/kg dry	3.44	0.999	09/08/10 12:10	mdk	10I0342	SW 7196A
Nitrate as N	<5.73		mg/kg dry	5.73	0.988	09/07/10 17:30	jmh	10I0261	SW 9210A
Nitrite as N	<5.15	P2	mg/kg dry	5.15	0.899	09/08/10 14:00	mdk	10I0348	SM 4500 NO3 E/00
pH	**8.40**	H3	pH Units	0.100	1	09/10/10 11:40	sas	10I0428	SW 9045D
Sulfate	<115	RL1	mg/kg dry	115	9.93	09/17/10 17:08	tlr	10I0820	SW 9056
Total Metals by SW 846 Series Methods									

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Erin Jarrett

Work Order: CTI0218
Project: Sauer Danfoss Soil Sampling
Project Number: 10-500

Received: 09/02/10
Reported: 09/27/10 15:14

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Quan. Limit	Dilution Factor	Date Analyzed	Analyst	Seq/ Batch	Method
Sample ID: CTI0218-06 (27867 B-4 6-7' - Soil) - cont.					**Sampled: 09/02/10 12:44**			**Recvd: 09/02/10 19:15**	
Total Metals by SW 846 Series Methods - cont.									
Arsenic	**6.61**		mg/kg dry	1.15	0.983	09/14/10 11:43	lbb	10I0303	SW 7060A
Barium	**53.2**		mg/kg dry	0.573	0.984	09/09/10 21:21	cjt	10I0371	SW 6010B
Cadmium	<1.15		mg/kg dry	1.15	0.984	09/09/10 21:21	cjt	10I0371	SW 6010B
Chromium	**13.8**		mg/kg dry	1.15	0.984	09/09/10 21:21	cjt	10I0371	SW 6010B
Copper	**11.8**		mg/kg dry	1.15	0.984	09/09/10 21:21	cjt	10I0371	SW 6010B
Iron	**12800**		mg/kg dry	5.73	0.984	09/09/10 21:21	cjt	10I0371	SW 6010B
Lead	**9.81**		mg/kg dry	5.73	0.984	09/09/10 21:21	cjt	10I0371	SW 6010B
Mercury	<0.0229		mg/kg dry	0.0229	0.92	09/10/10 12:44	kmd	10I0418	SW 7471A
Selenium	<8.59		mg/kg dry	8.59	0.984	09/09/10 21:21	cjt	10I0371	SW 6010B
Silver	<1.15		mg/kg dry	1.15	0.984	09/09/10 21:21	cjt	10I0371	SW 6010B
Volatile Organic Compounds									
Acetone	<47.5		ug/kg dry	47.5	0.83	09/09/10 14:55	EEE	10I0436	SW 8260B
1,1-Dichloroethane	<4.75		ug/kg dry	4.75	0.83	09/09/10 14:55	EEE	10I0436	SW 8260B
1,2-Dichloroethane	<4.75		ug/kg dry	4.75	0.83	09/09/10 14:55	EEE	10I0436	SW 8260B
1,1-Dichloroethene	<4.75		ug/kg dry	4.75	0.83	09/09/10 14:55	EEE	10I0436	SW 8260B
cis-1,2-Dichloroethene	**42.1**		ug/kg dry	4.75	0.83	09/09/10 14:55	EEE	10I0436	SW 8260B
trans-1,2-Dichloroethene	<4.75		ug/kg dry	4.75	0.83	09/09/10 14:55	EEE	10I0436	SW 8260B
Methylene Chloride	<47.5		ug/kg dry	47.5	0.83	09/09/10 14:55	EEE	10I0436	SW 8260B
Tetrachloroethene	**129**		ug/kg dry	4.75	0.83	09/09/10 14:55	EEE	10I0436	SW 8260B
1,1,1-Trichloroethane	**8.63**		ug/kg dry	4.75	0.83	09/09/10 14:55	EEE	10I0436	SW 8260B
1,1,2-Trichloroethane	<4.75		ug/kg dry	4.75	0.83	09/09/10 14:55	EEE	10I0436	SW 8260B
Trichloroethene	**6.18**		ug/kg dry	4.75	0.83	09/09/10 14:55	EEE	10I0436	SW 8260B
Vinyl chloride	<14.3		ug/kg dry	14.3	0.83	09/09/10 14:55	EEE	10I0436	SW 8260B
Xylenes, total	<14.3		ug/kg dry	14.3	0.83	09/09/10 14:55	EEE	10I0436	SW 8260B
Surr: Dibromofluoromethane (75-125%)	*104 %*								
Surr: Toluene-d8 (80-120%)	*88 %*								
Surr: 4-Bromofluorobenzene (80-120%)	*103 %*								
General Chemistry Parameters									
Sulfide	<50.0		mg/kg	50.0	1	09/05/10 15:10	JDJ	10I0796	SW846 9030B/9034
Total Organic Carbon	**14800**		mg/Kg dry	1000	1	09/20/10 10:30	SHJ	10I2801	SW846 9060M
1,4-DIOXANE BY GCMS - SINGLE ION MONITORING (SIM)									
1,4-Dioxane	**25**		ug/kg dry	5.5	0.973	09/15/10 14:32	ATL	10I1301	EPA 8260B-SIM
Surr: Dibromofluoromethane (80-125%)	*119 %*								
INORGANICS									
Percent Solids	**89**		%	0.10	1	09/20/10 14:00	DK	10I2074	SM2540B MOD.

TestAmerica Cedar Falls
Derrick Klinkenberg
Organics Manager

FEHR-GRAHAM & ASSOCIATES - ROCKFORD
1920 Daimler Rd
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Erin Jarrett

Work Order: CTI0218
Project: Sauer Danfoss Soil Sampling
Project Number: 10-500

Received: 09/02/10
Reported: 09/27/10 15:14

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Quan. Limit	Dilution Factor	Date Analyzed	Analyst	Seq/ Batch	Method
Sample ID: CTI0218-07 (27868 B-3 19' - Soil)					**Sampled: 09/02/10 11:10**			**Recvd: 09/02/10 19:15**	
General Chemistry Parameters									
% Solids	88.3		%	0.100	1	09/03/10 15:14	mrh	10I0186	SM 2540 G
Volatile Organic Compounds									
Acetone	<49.8		ug/kg dry	49.8	0.88	09/09/10 15:26	EEE	10I0436	SW 8260B
1,1-Dichloroethane	18.9		ug/kg dry	4.98	0.88	09/09/10 15:26	EEE	10I0436	SW 8260B
1,2-Dichloroethane	<4.98		ug/kg dry	4.98	0.88	09/09/10 15:26	EEE	10I0436	SW 8260B
1,1-Dichloroethene	140		ug/kg dry	4.98	0.88	09/09/10 15:26	EEE	10I0436	SW 8260B
cis-1,2-Dichloroethene	<4.98		ug/kg dry	4.98	0.88	09/09/10 15:26	EEE	10I0436	SW 8260B
trans-1,2-Dichloroethene	<4.98		ug/kg dry	4.98	0.88	09/09/10 15:26	EEE	10I0436	SW 8260B
Methylene Chloride	<49.8		ug/kg dry	49.8	0.88	09/09/10 15:26	EEE	10I0436	SW 8260B
Tetrachloroethene	2840		ug/kg dry	391	69.2	09/10/10 11:29	EEE	10I0472	SW 8260B
1,1,1-Trichloroethane	368		ug/kg dry	4.98	0.88	09/09/10 15:26	EEE	10I0436	SW 8260B
1,1,2-Trichloroethane	6.30		ug/kg dry	4.98	0.88	09/09/10 15:26	EEE	10I0436	SW 8260B
Trichloroethene	<4.98		ug/kg dry	4.98	0.88	09/09/10 15:26	EEE	10I0436	SW 8260B
Vinyl chloride	<14.9		ug/kg dry	14.9	0.88	09/09/10 15:26	EEE	10I0436	SW 8260B
Xylenes, total	<14.9		ug/kg dry	14.9	0.88	09/09/10 15:26	EEE	10I0436	SW 8260B
Surr: Dibromofluoromethane (75-125%)	*103 %*								
Surr: Toluene-d8 (80-120%)	*89 %*								
Surr: 4-Bromofluorobenzene (80-120%)	*107 %*								
Sample ID: CTI0218-08 (27869 Trip Blank - Water)					**Sampled: 09/02/10**			**Recvd: 09/02/10 19:15**	
Volatile Organic Compounds									
Acetone	<10.0		ug/L	10.0	1	09/03/10 15:34	sjn	10I0218	SW 8260B
1,1-Dichloroethane	<1.00		ug/L	1.00	1	09/03/10 15:34	sjn	10I0218	SW 8260B
1,2-Dichloroethane	<1.00		ug/L	1.00	1	09/03/10 15:34	sjn	10I0218	SW 8260B
1,1-Dichloroethene	<2.00		ug/L	2.00	1	09/03/10 15:34	sjn	10I0218	SW 8260B
cis-1,2-Dichloroethene	<1.00		ug/L	1.00	1	09/03/10 15:34	sjn	10I0218	SW 8260B
trans-1,2-Dichloroethene	<1.00		ug/L	1.00	1	09/03/10 15:34	sjn	10I0218	SW 8260B
Methylene Chloride	<5.00		ug/L	5.00	1	09/03/10 15:34	sjn	10I0218	SW 8260B
Tetrachloroethene	<1.00		ug/L	1.00	1	09/03/10 15:34	sjn	10I0218	SW 8260B
1,1,1-Trichloroethane	<1.00	CIN	ug/L	1.00	1	09/03/10 15:34	sjn	10I0218	SW 8260B
1,1,2-Trichloroethane	<1.00		ug/L	1.00	1	09/03/10 15:34	sjn	10I0218	SW 8260B
Trichloroethene	<1.00		ug/L	1.00	1	09/03/10 15:34	sjn	10I0218	SW 8260B
Vinyl chloride	<1.00		ug/L	1.00	1	09/03/10 15:34	sjn	10I0218	SW 8260B
Xylenes, total	<3.00		ug/L	3.00	1	09/03/10 15:34	sjn	10I0218	SW 8260B
Surr: Dibromofluoromethane (75-120%)	*90 %*								
Surr: Toluene-d8 (80-120%)	*103 %*								
Surr: 4-Bromofluorobenzene (75-110%)	*104 %*								
VOC Preservation Check									
pH	<2.00		units	2.00	1	09/08/10 15:06	eee	10I0319	SW

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Work Order: CTI0218
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SAMPLE EXTRACTION DATA

Parameter	Batch	Lab Number	Wt/Vol Extracted	Extracted Vol	Date	Analyst	Extraction Method
Total Metals by SW 846 Series Methods							
SW 6010B	1GI0371	CTI0218-01	1.01	50.00	09/09/10 13:14	KMD	SW 3050B
SW 6010B	10I0371	CTI0218-02	1.01	50.00	09/09/10 13:14	KMD	SW 3050B
SW 6010B	10I0371	CTI0218-06	1.02	50.00	09/09/10 13:14	KMD	SW 3050B
SW 7060A	10I0303	CTI0218-01	1.00	50.00	09/08/10 12:02	KMD	SW 3050B GFAA
SW 7060A	10I0303	CTI0218-02	1.01	50.00	09/08/10 12:02	KMD	SW 3050B GFAA
SW 7060A	10I0303	CTI0218-06	1.02	50.00	09/08/10 12:02	KMD	SW 3050B GFAA
SW 7471A	10I0418	CTI0218-01	0.63	30.00	09/10/10 10:09	KMD	EPA 245.5/SW 7471
SW 7471A	10I0418	CTI0218-02	0.65	30.00	09/10/10 10:09	KMD	EPA 245.5/SW 7471
SW 7471A	10I0418	CTI0218-06	0.65	30.00	09/10/10 10:09	KMD	EPA 245.5/SW 7471

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LABORATORY BLANK QC DATA

Analyte	Seq/ Batch	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
General Chemistry Parameters														
Nitrate as N	1010261			mg/kg wet	N/A	5.00	<5.00							
Chromium, Hexavalent	1010342			mg/kg wet	N/A	3.00	<3.00							
Nitrite as N	1010348			mg/kg wet	N/A	0.100	<0.100							
Sulfate	1010820			mg/kg wet	N/A	1.00	<1.00							
Total Metals by SW 846 Series Methods														
Arsenic	1010303			mg/kg wet	N/A	1.00	<1.00							
Barium	1010371			mg/kg wet	N/A	0.500	<0.500							
Cadmium	1010371			mg/kg wet	N/A	1.00	<1.00							
Chromium	1010371			mg/kg wet	N/A	1.00	<1.00							
Copper	1010371			mg/kg wet	N/A	1.00	<1.00							
Iron	1010371			mg/kg wet	N/A	5.00	<5.00							
Lead	1010371			mg/kg wet	N/A	5.00	<5.00							
Selenium	1010371			mg/kg wet	N/A	7.50	<7.50							
Silver	1010371			mg/kg wet	N/A	1.00	<1.00							
Mercury	1010418			mg/kg wet	N/A	0.0200	<0.0200							
Volatile Organic Compounds														
Acetone	1010218			ug/L	N/A	10.0	<10.0							
1,1-Dichloroethane	1010218			ug/L	N/A	1.00	<1.00							
1,2-Dichloroethane	1010218			ug/L	N/A	1.00	<1.00							
1,1-Dichloroethene	1010218			ug/L	N/A	2.00	<2.00							
cis-1,2-Dichloroethene	1010218			ug/L	N/A	1.00	<1.00							
trans-1,2-Dichloroethene	1010218			ug/L	N/A	1.00	<1.00							
Methylene Chloride	1010218			ug/L	N/A	5.00	<5.00							
Tetrachloroethene	1010218			ug/L	N/A	1.00	<1.00							
1,1,1-Trichloroethane	1010218			ug/L	N/A	1.00	<1.00							CIN
1,1,2-Trichloroethane	1010218			ug/L	N/A	1.00	<1.00							
Trichloroethene	1010218			ug/L	N/A	1.00	<1.00							
Vinyl chloride	1010218			ug/L	N/A	1.00	<1.00							
Xylenes, total	1010218			ug/L	N/A	3.00	<3.00							
Surrogate: Dibromofluoromethane	*1010218*			ug/L					*91*		*75-120*			
Surrogate: Toluene-d8	*1010218*			ug/L					*103*		*80-120*			
Surrogate: 4-Bromofluorobenzene	*1010218*			ug/L					*103*		*75-110*			
Acetone	1010436			ug/kg wet	N/A	102	<102							
1,1-Dichloroethane	1010436			ug/kg wet	N/A	10.2	<10.2							
1,2-Dichloroethane	1010436			ug/kg wet	N/A	10.2	<10.2							
1,1-Dichloroethene	1010436			ug/kg wet	N/A	10.2	<10.2							
cis-1,2-Dichloroethene	1010436			ug/kg wet	N/A	10.2	<10.2							
trans-1,2-Dichloroethene	1010436			ug/kg wet	N/A	10.2	<10.2							
Methylene Chloride	1010436			ug/kg wet	N/A	102	<102							
Tetrachloroethene	1010436			ug/kg wet	N/A	10.2	<10.2							
1,1,1-Trichloroethane	1010436			ug/kg wet	N/A	10.2	<10.2							

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FEHR-GRAHAM & ASSOCIATES - ROCKFORD
1920 Daimler Rd
Rockford, IL 611112
Erin Jarrett

Work Order: CTI0218
Project: Sauer Danfoss Soil Sampling
Project Number: 10-500

Received: 09/02/10
Reported: 09/27/10 15:14

LABORATORY BLANK QC DATA

Analyte	Seq/ Batch	Source Result	Spike Level	Units	MDL	MRL	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Volatile Organic Compounds													
1,1,2-Trichloroethane	1010436			ug/kg wet	N/A	10.2	<10.2						
Trichloroethene	1010436			ug/kg wet	N/A	10.2	<10.2						
Vinyl chloride	1010436			ug/kg wet	N/A	30.5	<30.5						
Xylenes, total	1010436			ug/kg wet	N/A	30.5	<30.5						
Surrogate: Dibromofluoromethane	*1010436*			ug/L				*99*		*75-125*			
Surrogate: Toluene-d8	*1010436*			ug/L				*90*		*80-120*			
Surrogate: 4-Bromofluorobenzene	*1010436*			ug/L				*101*		*80-120*			
Acetone	1010472			ug/kg wet	N/A	2350	<2350						L
1,1-Dichloroethane	1010472			ug/kg wet	N/A	235	<235						
1,2-Dichloroethane	1010472			ug/kg wet	N/A	235	<235						
1,1-Dichloroethene	1010472			ug/kg wet	N/A	235	<235						
cis-1,2-Dichloroethene	1010472			ug/kg wet	N/A	235	<235						
trans-1,2-Dichloroethene	1010472			ug/kg wet	N/A	235	<235						
Methylene Chloride	1010472			ug/kg wet	N/A	2350	<2350						CIN
Tetrachloroethene	1010472			ug/kg wet	N/A	235	<235						
1,1,1-Trichloroethane	1010472			ug/kg wet	N/A	235	<235						
1,1,2-Trichloroethane	1010472			ug/kg wet	N/A	235	<235						
Trichloroethene	1010472			ug/kg wet	N/A	235	<235						
Vinyl chloride	1010472			ug/kg wet	N/A	705	<705						
Xylenes, total	1010472			ug/kg wet	N/A	705	<705						
Surrogate: Dibromofluoromethane	*1010472*			ug/L				*103*		*75-125*			
Surrogate: Toluene-d8	*1010472*			ug/L				*94*		*80-120*			
Surrogate: 4-Bromofluorobenzene	*1010472*			ug/L				*104*		*80-120*			
General Chemistry Parameters													
Sulfide	1010796			mg/kg	N/A	50.0	<50.0						
Total Organic Carbon	1012801			mg/Kg dry	N/A	1000	<1000						
1,4-DIOXANE BY GCMS - SINGLE ION MONITORING (SIM)													
1,4-Dioxane	1011301			ug/kg wet	N/A	5.0	<5.0						
Surrogate: Dibromofluoromethane	*1011301*			ug/kg wet				*107*		*80-125*			

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Erin Jarrett

Work Order: CTI0218
Project: Sauer Danfoss Soil Sampling
Project Number: 10-500

Received: 09/02/10
Reported: 09/27/10 15:14

LABORATORY DUPLICATE QC DATA

Analyte	Seq/ Batch	Source Result	Spike Level	Units	MDL	MRL	Dup Result	% REC	% REC Limits	RPD	RPD Limit	Q
General Chemistry Parameters												
QC Source Sample: CTI0176-01												
% Solids	1010186	79.3		%	N/A	0.100	78.9			1	10	
QC Source Sample: CTI0276-02												
% Solids	1010186	96.2		%	N/A	0.100	96.3			0	10	
QC Source Sample: CTH1458-01												
pH	1010428	7.50		pH Units	N/A	0.100	7.60			1	15	H3
QC Source Sample: CTI0046-01												
pH	1010428	9.60		pH Units	N/A	0.100	9.70			1	15	H3
QC Source Sample: CTI0254-05												
pH	1010428	8.90		pH Units	N/A	0.100	8.90			0	15	H3
Total Metals by SW 846 Series Methods												
QC Source Sample: CTI0218-06												
Arsenic	1010303	6.61		mg/kg dry	N/A	1.15	5.47			19	20	
QC Source Sample: CTI0294-08												
Barium	1010371	142		mg/kg dry	N/A	1.87	143			1	20	
Cadmium	1010371	<3.73		mg/kg dry	N/A	3.73	<3.73				20	IE
Chromium	1010371	21.5		mg/kg dry	N/A	3.73	17.9			19	20	
Copper	1010371	14.5		mg/kg dry	N/A	3.73	15.5			7	20	
Iron	1010371	30400		mg/kg dry	N/A	18.7	28000			8	10	
Lead	1010371	8.06		mg/kg dry	N/A	18.7	6.23			26	20	IE,R
Selenium	1010371	<28.0		mg/kg dry	N/A	28.0	<28.0				20	IE
Silver	1010371	<3.73		mg/kg dry	N/A	3.73	<3.73				20	IE
General Chemistry Parameters												
QC Source Sample: NTH2554-02												
Sulfide	1010796	13.0		mg/kg	N/A	50.0	14.0			7	20	
QC Source Sample: CTI0218-06												
Total Organic Carbon	1012801	14800		mg/Kg dry	N/A	1000	14100			5	35	

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LCS/LCS DUPLICATE QC DATA

Analyte	Seq/ Batch	Source Result	Spike Level	Units	MDL	MRL	Dup Result	% Dup REC	% REC Limits	RPD	RPD Limit	Q
General Chemistry Parameters												
Nitrate as N	10I0261		3.04	mg/kg wet	N/A	1.00	2.91	96	90-110			
Chromium, Hexavalent	10I0342		0.307	mg/kg wet	N/A	0.0750	0.286	93	90-110			
Nitrite as N	10I0348		0.500	mg/kg wet	N/A	0.100	0.514	103	80-120			
pH	10I0428		7.00	pH Units	N/A	N/A	6.98	100	98-102			
Alkalinity, Total (CaCO3)	10I0613		1000	mg/L	N/A	N/A	1000	100	90-110			
Sulfate	10I0820		10.0	mg/L	N/A	N/A	9.96	100	90-110			
Total Metals by SW 846 Series Methods												
Arsenic	10I0303		1.98	mg/kg wet	N/A	1.00	1.98	100	80-120			
Barium	10I0371		49.3	mg/kg wet	N/A	0.500	46.5	94	80-110			
Cadmium	10I0371		49.3	mg/kg wet	N/A	1.00	46.0	93	85-105			
Chromium	10I0371		49.3	mg/kg wet	N/A	1.00	49.3	100	85-105			
Copper	10I0371		98.6	mg/kg wet	N/A	1.00	98.5	100	85-105			
Iron	10I0371		98.6	mg/kg wet	N/A	5.00	101	103	85-115			
Lead	10I0371		98.6	mg/kg wet	N/A	5.00	95.7	97	85-105			
Selenium	10I0371		197	mg/kg wet	N/A	7.50	190	96	85-105			
Silver	10I0371		49.3	mg/kg wet	N/A	1.00	44.8	91	80-120			
Mercury	10I0418		0.161	mg/kg wet	N/A	0.0200	0.158	98	80-120			
Volatile Organic Compounds												
Acetone	10I0218		20.0	ug/L	N/A	N/A	25.3	126	60-150		20	
1,1-Dichloroethane	10I0218		20.0	ug/L	N/A	N/A	21.8	109	60-130		15	
1,2-Dichloroethane	10I0218		20.0	ug/L	N/A	N/A	21.9	110	65-140		15	
1,1-Dichloroethene	10I0218		20.0	ug/L	N/A	N/A	21.0	105	60-135		20	
cis-1,2-Dichloroethene	10I0218		20.0	ug/L	N/A	N/A	21.3	106	70-135		15	
trans-1,2-Dichloroethene	10I0218		20.0	ug/L	N/A	N/A	25.5	127	60-145		15	
Methylene Chloride	10I0218		20.0	ug/L	N/A	N/A	22.6	113	55-145		20	
Tetrachloroethene	10I0218		20.0	ug/L	N/A	N/A	25.8	129	70-135		15	
1,1,1-Trichloroethane	10I0218		20.0	ug/L	N/A	N/A	24.5	123	60-125		15	CIN
1,1,2-Trichloroethane	10I0218		20.0	ug/L	N/A	N/A	22.6	113	75-125		15	
Trichloroethene	10I0218		20.0	ug/L	N/A	N/A	23.6	118	70-130		20	
Vinyl chloride	10I0218		20.0	ug/L	N/A	N/A	19.5	97	45-135		20	
Xylenes, total	10I0218		60.0	ug/L	N/A	N/A	79.2	132	70-130		35	L5
Surrogate: Dibromofluoromethane	*10I0218*			ug/L				*95*	*75-120*			
Surrogate: Toluene-d8	*10I0218*			ug/L				*104*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*10I0218*			ug/L				*110*	*80-120*			
Acetone	10I0436		40.0	ug/kg wet	N/A	100	70.5	176	65-150		40	L5
1,1-Dichloroethane	10I0436		40.0	ug/kg wet	N/A	10.0	39.7	99	55-135		40	
1,2-Dichloroethane	10I0436		40.0	ug/kg wet	N/A	10.0	40.9	102	60-140		30	
1,1-Dichloroethene	10I0436		40.0	ug/kg wet	N/A	10.0	33.7	84	50-145		40	
cis-1,2-Dichloroethene	10I0436		40.0	ug/kg wet	N/A	10.0	40.4	101	60-135		40	

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Erin Jarrett

Work Order: CTI0218
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Project Number: 10-500

Received: 09/02/10
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LCS/LCS DUPLICATE QC DATA

Analyte	Seq/ Batch	Source Result	Spike Level	Units	MDL	MRL	Dup Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Volatile Organic Compounds														
trans-1,2-Dichloroethene	1010436		40.0	ug/kg wet	N/A	10.0	41.4		103		55-135		40	
Methylene Chloride	1010436		40.0	ug/kg wet	N/A	100	42.1		105		55-145		40	
Tetrachloroethene	1010436		40.0	ug/kg wet	N/A	10.0	37.6		94		55-125		40	
1,1,1-Trichloroethane	1010436		40.0	ug/kg wet	N/A	10.0	35.5		89		60-125		30	
1,1,2-Trichloroethane	1010436		40.0	ug/kg wet	N/A	10.0	38.0		95		55-135		30	
Trichloroethene	1010436		40.0	ug/kg wet	N/A	10.0	38.7		97		60-130		30	
Vinyl chloride	1010436		40.0	ug/kg wet	N/A	30.0	39.5		99		45-140		40	
Xylenes, total	1010436		120	ug/kg wet	N/A	30.0	106		89		50-130		30	
Surrogate: Dibromofluoromethane	*1010436*			ug/L					*102*		*75-125*			
Surrogate: Toluene-d8	*1010436*			ug/L					*89*		*80-120*			
Surrogate: 4-Bromofluorobenzene	*1010436*			ug/L					*105*		*80-120*			
Acetone	1010472		992	ug/kg wet	N/A	2480	1760	1650	177	166	65-150	6	40	L
1,1-Dichloroethane	1010472		992	ug/kg wet	N/A	248	954	943	96	95	55-135	1	40	
1,2-Dichloroethane	1010472		992	ug/kg wet	N/A	248	1010	972	102	98	60-140	4	30	
1,1-Dichloroethene	1010472		992	ug/kg wet	N/A	248	1070	1050	108	106	50-145	2	40	
cis-1,2-Dichloroethene	1010472		992	ug/kg wet	N/A	248	1060	1010	107	102	60-135	5	40	
trans-1,2-Dichloroethene	1010472		992	ug/kg wet	N/A	248	1070	1050	108	106	55-135	2	40	
Methylene Chloride	1010472		992	ug/kg wet	N/A	2480	968	916	98	92	55-145	6	40	CIN
Tetrachloroethene	1010472		992	ug/kg wet	N/A	248	1100	1070	111	107	55-125	3	40	
1,1,1-Trichloroethane	1010472		992	ug/kg wet	N/A	248	962	925	97	93	60-125	4	30	
1,1,2-Trichloroethane	1010472		992	ug/kg wet	N/A	248	988	949	100	96	55-135	4	30	
Trichloroethene	1010472		992	ug/kg wet	N/A	248	994	956	100	96	60-130	4	30	
Vinyl chloride	1010472		992	ug/kg wet	N/A	744	1060	1050	107	106	45-140	1	40	
Xylenes, total	1010472		2980	ug/kg wet	N/A	744	3090	2980	104	100	50-130	4	30	
Surrogate: Dibromofluoromethane	*1010472*			ug/L					*102*	*104*	*75-125*			
Surrogate: Toluene-d8	*1010472*			ug/L					*95*	*94*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*1010472*			ug/L					*106*	*104*	*80-120*			
General Chemistry Parameters														
Sulfide	1010796		200	mg/kg	N/A	50.0	203	205	102	102	80-120	1	20	
Total Organic Carbon	1012801		29900	mg/Kg dry	N/A	1000	29200		98		80-120			
1,4-DIOXANE BY GCMS - SINGLE ION MONITORING (SIM)														
1,4-Dioxane	1011301		20.0	ug/kg wet	N/A	5.0	21.6	21.7	108	108	70-130	1	30	
Surrogate: Dibromofluoromethane	*1011301*			ug/kg wet					*106*	*108*	*80-125*			

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Project Number: 10-500

Received: 09/02/10
Reported: 09/27/10 15:14

MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC DATA

Analyte	Seq/ Batch	Source Result	Spike Level	Units	MDL	MRL	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
General Chemistry Parameters													
QC Source Sample: CTI0038-01													
Nitrate as N	10I0261	<66.9	669	mg/kg dry	N/A	66.9	638	640	95	96	75-125	0	15	
QC Source Sample: CTI0218-01													
Chromium, Hexavalent	10I0342	<3.52	11.5	mg/kg dry	N/A	3.52	12.4	12.5	108	109	75-125	1	20	
QC Source Sample: CTI0218-01													
Nitrite as N	10I0348	<5.86	11.6	mg/kg dry	N/A	5.86	12.4	12.6	106	109	75-125	2	10	P2
QC Source Sample: CTI0218-01													
Alkalinity, Total (CaCO3)	10I0613	5.16	113	mg/L	N/A	N/A	118	118	100	100	75-125	0	20	
QC Source Sample: CTI0218-01													
Sulfate	10I0820	37.6	583	mg/kg dry	N/A	117	583	587	94	94	80-120	1	20	RL1
Total Metals by SW 846 Series Methods													
QC Source Sample: CTH1565-01													
Arsenic	10I0303	3.91	19.8	mg/kg dry	N/A	4.97	17.0	14.5	66	55	75-125	16	20	M1
QC Source Sample: CTI0218-02													
Arsenic	10I0303	8.89	4.77	mg/kg dry	N/A	2.41	13.2		90		75-125			
QC Source Sample: CTI0294-01													
Barium	10I0371	96.5	117	mg/kg dry	N/A	0.595	200	210	88	97	75-125	5	20	
Cadmium	10I0371	<1.19	117	mg/kg dry	N/A	1.19	105	103	90	88	75-110	2	15	
Chromium	10I0371	14.9	117	mg/kg dry	N/A	1.19	124	127	93	96	75-120	2	20	
Copper	10I0371	8.82	235	mg/kg dry	N/A	1.19	237	236	97	97	75-120	1	15	
Iron	10I0371	19000	235	mg/kg dry	N/A	5.95	19000	24900	4	2540	75-125	27	20	MHA,R
Lead	10I0371	6.63	235	mg/kg dry	N/A	5.95	228	223	94	93	75-125	2	15	
Selenium	10I0371	<8.92	470	mg/kg dry	N/A	8.92	437	430	93	92	75-115	2	20	
Silver	10I0371	<1.19	117	mg/kg dry	N/A	1.19	106	103	90	89	75-110	3	20	
QC Source Sample: CTI0294-07													
Barium	10I0371	233	115	mg/kg dry	N/A	0.592	278		39		75-125			MHA
Cadmium	10I0371	0.314	115	mg/kg dry	N/A	1.18	101		87		75-110			
Chromium	10I0371	23.3	115	mg/kg dry	N/A	1.18	133		95		75-120			
Copper	10I0371	16.3	230	mg/kg dry	N/A	1.18	229		92		75-120			
Iron	10I0371	19100	230	mg/kg dry	N/A	5.92	18400		-294		75-125			MHA
Lead	10I0371	11.8	230	mg/kg dry	N/A	5.92	220		90		75-125			
Selenium	10I0371	<8.87	461	mg/kg dry	N/A	8.87	424		92		75-115			
Silver	10I0371	<1.18	115	mg/kg dry	N/A	1.18	99.3		86		75-110			
QC Source Sample: CTI0068-02													
Mercury	10I0418	0.0625	0.164	mg/kg dry	N/A	0.0202	0.206	0.203	88	86	70-130	1	20	
Volatile Organic Compounds													
QC Source Sample: CTI0151-02													
Acetone	10I0218	14.5	20.0	ug/L	N/A	N/A	27.2		63		45-150		35	
1,1-Dichloroethane	10I0218	<1.00	20.0	ug/L	N/A	N/A	19.3		96		50-130		25	
1,2-Dichloroethane	10I0218	<1.00	20.0	ug/L	N/A	N/A	20.2		101		55-140		15	
1,1-Dichloroethene	10I0218	<2.00	20.0	ug/L	N/A	N/A	18.2		91		35-135		30	
cis-1,2-Dichloroethene	10I0218	1.11	20.0	ug/L	N/A	N/A	20.5		97		45-135		20	
trans-1,2-Dichloroethene	10I0218	0.250	20.0	ug/L	N/A	N/A	23.2		115		45-145		35	
Methylene Chloride	10I0218	0.200	20.0	ug/L	N/A	N/A	22.2		110		45-145		30	
Tetrachloroethene	10I0218	<1.00	20.0	ug/L	N/A	N/A	25.8		129		40-135		20	
1,1,1-Trichloroethane	10I0218	0.0100	20.0	ug/L	N/A	N/A	22.8		114		40-125		20	CIN
1,1,2-Trichloroethane	10I0218	0.0200	20.0	ug/L	N/A	N/A	22.5		112		60-130		15	
Trichloroethene	10I0218	0.490	20.0	ug/L	N/A	N/A	22.4		110		50-130		20	
Vinyl chloride	10I0218	0.0500	20.0	ug/L	N/A	N/A	17.8		89		30-135		20	

TestAmerica Cedar Falls
Derrick Klinkenberg
Organics Manager

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MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC DATA

Analyte	Seq/ Batch	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Volatile Organic Compounds														
QC Source Sample: CTI0151-02														
Xylenes, total	1010218	<3.00	60.0	ug/L	N/A	N/A	74.6		124		40-135		20	
Surrogate: Dibromofluoromethane	*1010218*			ug/L					*92*		*75-120*			
Surrogate: Toluene-d8	*1010218*			ug/L					*107*		*80-120*			
Surrogate: 4-Bromofluorobenzene	*1010218*			ug/L					*110*		*80-120*			
QC Source Sample: CTI0218-04														
Acetone	1010436	14.6	45.0	ug/kg dry	N/A	113	75.0	73.5	134	128	55-150	2	40	
1,1-Dichloroethane	1010436	<11.3	45.0	ug/kg dry	N/A	11.3	40.2	40.9	89	89	50-135	2	35	
1,2-Dichloroethane	1010436	<11.3	45.0	ug/kg dry	N/A	11.3	42.4	41.7	94	91	50-140	2	40	
1,1-Dichloroethene	1010436	4.24	45.0	ug/kg dry	N/A	11.3	34.2	35.2	66	67	45-145	3	35	
cis-1,2-Dichloroethene	1010436	31.3	45.0	ug/kg dry	N/A	11.3	42.7	45.0	25	30	50-135	5	35	M1
trans-1,2-Dichloroethene	1010436	<11.3	45.0	ug/kg dry	N/A	11.3	40.2	41.9	89	91	45-135	4	40	
Methylene Chloride	1010436	2.07	45.0	ug/kg dry	N/A	113	45.4	44.6	96	93	35-145	2	35	
Tetrachloroethene	1010436	171	45.0	ug/kg dry	N/A	11.3	46.6	57.4	-277	-248	30-125	21	40	M1
1,1,1-Trichloroethane	1010436	19.2	45.0	ug/kg dry	N/A	11.3	36.5	39.0	38	43	45-125	7	35	M1
1,1,2-Trichloroethane	1010436	<11.3	45.0	ug/kg dry	N/A	11.3	39.1	38.5	87	84	45-135	2	40	
Trichloroethene	1010436	5.12	45.0	ug/kg dry	N/A	11.3	38.7	39.3	75	74	40-130	1	35	
Vinyl chloride	1010436	<33.8	45.0	ug/kg dry	N/A	33.8	39.6	41.6	88	90	40-140	5	40	
Xylenes, total	1010436	2.08	135	ug/kg dry	N/A	33.8	105	106	77	76	30-130	1	40	
Surrogate: Dibromofluoromethane	*1010436*			ug/L					*103*	*102*	*75-125*			
Surrogate: Toluene-d8	*1010436*			ug/L					*91*	*91*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*1010436*			ug/L					*106*	*106*	*80-120*			
General Chemistry Parameters														
QC Source Sample: NTH2554-01														
Sulfide	1010796	24.0	200	mg/kg	N/A	50.0	173	170	74	73	70-130	2	12	
1,4-DIOXANE BY GCMS - SINGLE ION MONITORING (SIM)														
QC Source Sample: CTI0218-04														
1,4-Dioxane	1011301	28.2	22.2	ug/kg dry	N/A	5.5	49.3	50.3	95	97	70-130	2	30	
Surrogate: Dibromofluoromethane	*1011301*			ug/kg dry					*118*	*118*	*80-125*			

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

704 Enterprise Drive Cedar Falls, IA 50613 * 800-750-2401 * Fax 319-277-2425

FEHR-GRAHAM & ASSOCIATES - ROCKFORD
1920 Daimler Rd
Rockford, IL 611112
Erin Jarrett

Work Order: CTI0218
Project: Sauer Danfoss Soil Sampling
Project Number: 10-500

Received: 09/02/10
Reported: 09/27/10 15:14

CERTIFICATION SUMMARY

TestAmerica Cedar Falls

Method	Matrix	Nelac	Iowa
SM 2320 B	Solid/Soil		
SM 2540 G	Solid/Soil		X
SM 4500 NO3 E/00	Solid/Soil		X
SW 6010B	Solid/Soil	X	X
SW 7060A	Solid/Soil	X	X
SW 7196A	Solid/Soil		X
SW 7471A	Solid/Soil	X	X
SW 8260B	Solid/Soil	X	X
SW 8260B	Water - NonPotable	X	X
SW 9045D	Solid/Soil	X	X
SW 9056	Solid/Soil		X
SW 9210A	Solid/Soil		X
SW	Water - NonPotable		

Subcontracted Laboratories

TestAmerica Irvine

17461 Derian Avenue, Suite 100 - Irvine, CA 92614

Method Performed: EPA 8260B-SIM
Samples: CTI0218-01, CTI0218-02, CTI0218-04, CTI0218-06

Method Performed: SM2540B MOD.
Samples: CTI0218-01, CTI0218-02, CTI0218-04, CTI0218-06

TestAmerica Nashville NELAC Cert #87358, Illinois Cert #001366, Iowa Cert #131, Kansas Cert #E-10229, Minnesota Cert #047-999-345, Wisconsin Cert #998020436

2960 Foster Creighton Dr. - Nashville, TN 37204

Method Performed: SW846 9030B/9034
Samples: CTI0218-01, CTI0218-02, CTI0218-06

Method Performed: SW846 9060M
Samples: CTI0218-01, CTI0218-02, CTI0218-06

Any abnormalities or departures from sample acceptance policy shall be documented on the 'Sample Receipt and Termperature Log Form' and 'Sample Non-conformance Form' (if applicable) included with this report.

For information concerning certifications of this facility or another TestAmerica facility, please visit our website at www.TestAmericaInc.com

Samples collected by TestAmerica Field Services personnel are noted on the Chain of Custody (COC) and are sampled in accordance with TA-CF SOP CF-FSS-01.

TestAmerica Cedar Falls
Derrick Klinkenberg
Organics Manager

FEHR-GRAHAM & ASSOCIATES - ROCKFORD
1920 Daimler Rd
Rockford, IL 611112
Erin Jarrett

Work Order: CTI0218
Project: Sauer Danfoss Soil Sampling
Project Number: 10-500

Received: 09/02/10
Reported: 09/27/10 15:14

DATA QUALIFIERS AND DEFINITIONS

CIN	The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C.
H3	Sample was received and analyzed past holding time.
IE	Elevated reporting limit due to interelement interference.
L	Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was above the control limits. Analyte not detected, data not impacted.
L5	Laboratory Control Sample was outside of acceptance limits. The MS or MSD was used to validate the batch.
M1	The MS and/or MSD were outside control limits.
MHA	Due to high levels of analyte in the sample, the MS/MSD calculation does not provide useful spike recovery information.
P2	Sample adjusted to method prescribed pH range prior to analysis.
R	Sample duplicate RPD exceeded the laboratory control limit.
RL1	Reporting limit raised due to sample matrix effects.

ADDITIONAL COMMENTS

Results are reported on a wet weight basis unless otherwise noted.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Cedar Falls Division
704 Enterprise Drive
Cedar Falls, IA 50613

Phone 319-277-2401 or 800-750-2401
Fax 319-277-2425

To assist us in using the proper analytical methods, is this work being conducted for regulatory purposes?
Compliance Monitoring

Client Name: Fehr-Graham & Assoc. Client #:
Address: 1920 Daimler Rd.
City/State/Zip Code: Rockford, IL 61112
Project Manager: Joel Z
Email Address: jzirkle@fehr-graham-corp
Telephone Number: 815-394-4700 Fax: 815-394-4702
Sampler Name: (Print Name) Jeff Ogden
Sampler Signature:

Project Name: Sauer Danfoss
Project #: 10-500
Site/Location ID: Ames, IA State:
Report To: Erin Jarrett | Jeff Ogden
Invoice To: Erin Jarrett
Quote #: PO#:

TAT
X Standard
___ Rush (surcharges may apply)
Date Needed:
Fax Results: Y N
Email Results: (Y) N

QC Deliverables
___ None
___ Level 2 (Batch QC)
___ Level 3
___ Level 4
Other:

SAMPLE ID	Date Sampled	Time Sampled	G = Grab, C = Composite	Field Filtered	Matrix: SL - Sludge, DW - Drinking Water, GW - Groundwater, S - Soil/Solid, WW - Wastewater, Specify, Other	Preservation & # of Containers: HNO_3	HCl	NaOH	H_2SO_4	Methanol	None	Other (Specify)	Analyze For: VOC list below	1,4-Dioxane	Alkalinity	Sulfate / Sulfide	Nitrate / Nitrite	pH	TOC	RCRA 8 metals	Cr, Cu, Fe		REMARKS
27860 B-1 @ 6'-7'	09/02/10	09:08	G		S					1	2	2	X	X	X	X	X	X	X	X	X		QA/QC Narrative
27861 B-2 @ 6'-7'		09:58			S					1	2	2		X	X	X	X	X	X	X	X		
27862 B-2 @ 19'-20'		10:20			S					1	1	2											
27863 B-3 @ 6'-7'		10:51			S					2	2	4		X									
27869 B-3 @ 6'-7' Dup		10:51			S					1	1	2											
27865 B-3 @ 6'-7' MS		10:51			S					1	1	2											
27866 B-3 @ 6'-7' MSD		10:51			S					1	1	2											
27867 B-4 @ 6'-7'		12:41			S					2	3	4		X	X	X	X	X	X	X	X		
27868 B-3 @ 19		11:10			S					1	1	2											
27869 Trip Blank					water		3						X										

Special Instructions:
VOC list = Acetone; 1,1-DCA; 1,2-DCA; 1,1-DCE; cis-1,2-DCE; trans-1,2-DCE; Methylene Chloride; PCE; 1,1,1-TCA; 1,1,2-TCA; TCE; VC; Xylenes (total) Hold all samples

Relinquished By:	Date: 09/02/10	Time: 17:06	Received By:	Date: 09/02/10	Time: 17:15
Relinquished By:	Date: 09/02/10	Time:	Received By:	Date: 9/2/10	Time: 1915
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

LABORATORY COMMENTS:

TAL-0033 (0706)

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

704 ENTERPRISE DRIVE • CEDAR FALLS, IA 50613
800-750-2401 • 319-277-2425 FAX

Sample Receipt and Temperature Log Form

Client: Fehr Graham and Associates Project: _____

City: Rockford, IL

Date: 9/2/10 Receiver's Initials: JMH Time (Delivered): 1915

Temperature Record:

Cooler ID# (If Applicable)
L-20

0.9 °C / On ice

☑ Temp Blank

☐ Temperature out of compliance

Thermometer:

☐ IR - 61997671 'B'
☑ IR - 90876942 'C'
☐ IR - 61854108
☐ 22126775

Courier:

☐ UPS ☐ TA Courier
☐ FedEx ☐ TA Field Services
☐ FedEx Ground ☑ Client
☐ US Postal Service ☐ Other
☐ Spee-Dee

Custody seals present?
☐ Yes
Custody seals intact?
☐ Yes ☐ No

☒ Non-Conformance report started

Exceptions Noted

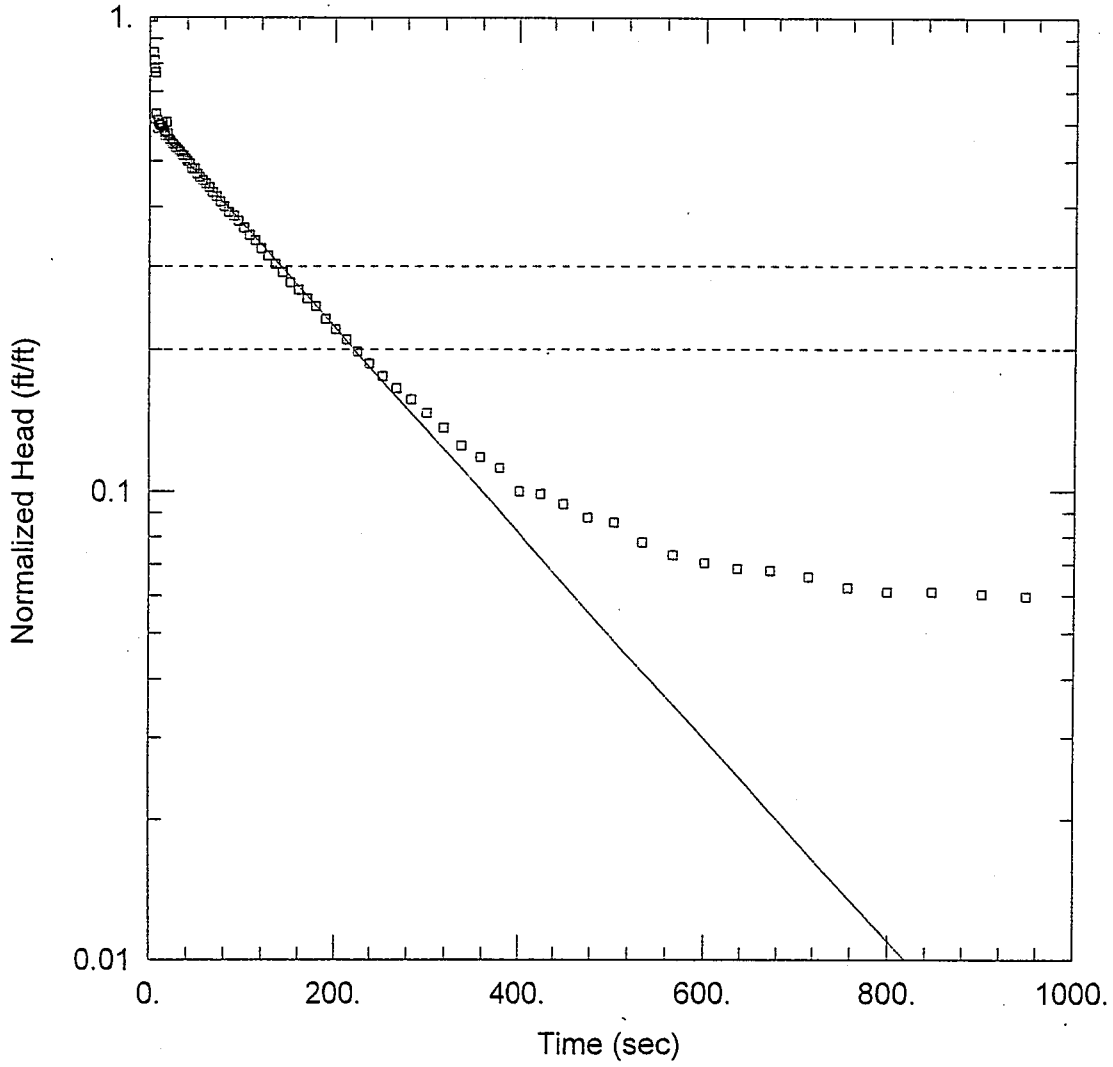
☐ Sample(s) not received in a cooler.
☐ Samples(s) received same day of sampling.
☒ Evidence of a chilling process
☒ Temperature not taken: _____

Purge vials

*Refer to SOP CF-SS-01 for Temperature Criteria

Appendix C

Slug Test Data



WELL TEST ANALYSIS

Data Set: I:\Documents\2010\10-500\Slug Tests\MW-10\MW-10.aqt
Date: 11/03/10 Time: 15:52:09

PROJECT INFORMATION

Company: Fehr-Graham & Associates
Client: Sauer Danfoss
Project: 10-500
Location: Ames, IA
Test Well: MW-10
Test Date: 09/01/10

AQUIFER DATA

Saturated Thickness: 10.1 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-10)

Initial Displacement: 1.491 ft
Total Well Penetration Depth: 5.03 ft
Casing Radius: 0.083 ft
Static Water Column Height: 5.03 ft
Screen Length: 3. ft
Wellbore Radius: 0.34 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0002515 cm/sec
y0 = 0.9064 ft

Data Set: I:\Documents\2010\10-500\Slug Tests\MW-10\MW-10.aqt
Date: 11/03/10
Time: 15:58:03

PROJECT INFORMATION

Company: Fehr-Graham & Associates
Client: Sauer Danfoss
Project: 10-500
Location: Ames, IA
Test Date: 09/01/10
Test Well: MW-10

AQUIFER DATA

Saturated Thickness: 10.1 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : MW-10

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 1.491 ft
Static Water Column Height: 5.03 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.34 ft
Well Skin Radius: 0.34 ft
Screen Length: 3. ft
Total Well Penetration Depth: 5.03 ft

No. of Observations: 89

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
3.	1.491	79.8	0.597
4.5	1.258	84.6	0.581
5.	1.213	90.	0.571
5.25	1.167	94.8	0.556
6.36	1.143	100.8	0.539
6.72	0.935	106.8	0.52
8.46	0.908	112.8	0.507
9.	0.873	119.4	0.488
9.48	0.898	126.6	0.471
10.08	0.888	134.4	0.453
10.68	0.89	142.2	0.435
11.28	0.892	150.6	0.414
11.94	0.883	159.6	0.399
12.66	0.874	169.3	0.382
13.44	0.898	178.8	0.368
14.22	0.874	189.7	0.346
15.06	0.857	201.	0.329
15.96	0.864	213.	0.313
16.92	0.844	225.6	0.295
17.88	0.901	238.8	0.278
18.96	0.851	253.2	0.261
20.1	0.83	268.2	0.246
21.3	0.826	283.8	0.233
22.56	0.819	300.6	0.218
23.88	0.811	318.6	0.203
25.32	0.807	337.2	0.186
26.82	0.799	357.6	0.176
28.38	0.795	378.6	0.167
30.06	0.787	400.8	0.149
31.86	0.78	424.8	0.147
33.81	0.77	450.	0.14
35.76	0.765	476.4	0.131
37.86	0.754	504.6	0.128
40.08	0.745	534.6	0.116
42.48	0.736	566.4	0.109

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
45.08	0.719	600.	0.105
47.64	0.72	636.1	0.102
50.46	0.7	672.	0.101
53.46	0.689	714.	0.098
56.64	0.678	756.1	0.093
60.	0.668	798.	0.091
63.6	0.656	846.1	0.091
67.2	0.64	900.	0.09
71.4	0.627	948.	0.089
75.6	0.611		

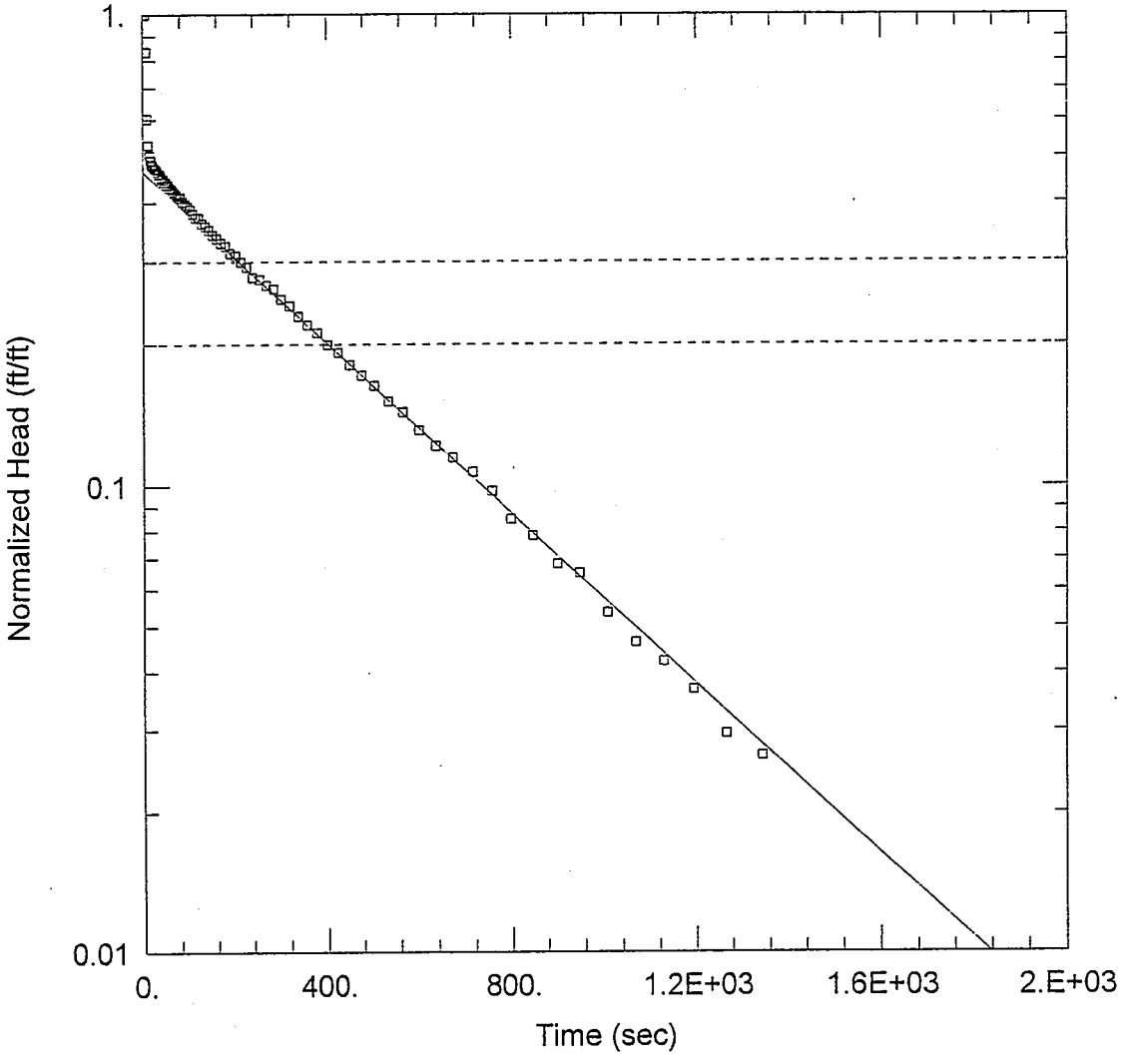
SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
Shape Factor: 1.432

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.0002515	cm/sec
y0	0.9064	ft



WELL TEST ANALYSIS

Data Set: I:\Documents\2010\10-500\Corrective Action\Slug Tests\MW-R13\MW-R13.aqt
Date: 09/07/10 Time: 14:37:45

PROJECT INFORMATION

Company: Fehr-Graham & Associates
Client: Sauer Danfoss
Project: 10-500
Location: Ames, IA
Test Well: MW-R13
Test Date: 09/01/10

AQUIFER DATA

Saturated Thickness: 12.2 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-R13)

Initial Displacement: 1.662 ft
Total Well Penetration Depth: 16.22 ft
Casing Radius: 0.083 ft
Static Water Column Height: 16.22 ft
Screen Length: 10. ft
Wellbore Radius: 0.34 ft

SOLUTION

Aquifer Model: Unconfined
K = 6.254E-05 cm/sec
Solution Method: Bouwer-Rice
y0 = 0.7721 ft

Data Set: T:\Documents\2010\10-500\Corrective Action\Slug Tests\MW-R13\MW-R13.aqt
Date: 09/07/10
Time: 14:37:51

PROJECT INFORMATION

Company: Fehr-Graham & Associates
Client: Sauer Danfoss
Project: 10-500
Location: Ames, IA
Test Date: 09/01/10
Test Well: MW-R13

AQUIFER DATA

Saturated Thickness: 12.2 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : MW-R13

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 1.662 ft
Static Water Column Height: 16.22 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.34 ft
Well Skin Radius: 0.34 ft
Screen Length: 10. ft
Total Well Penetration Depth: 16.22 ft

No. of Observations: 83

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
5.5	1.662	134.4	0.593
7.141	1.389	142.2	0.583
9.	1.002	150.6	0.569
10.68	0.882	159.6	0.559
14.22	0.837	169.2	0.547
15.96	0.819	178.8	0.539
16.92	0.817	189.6	0.52
17.88	0.804	201.	0.514
18.96	0.8	213.	0.499
20.1	0.796	225.6	0.486
21.3	0.794	238.8	0.462
22.56	0.787	253.2	0.458
23.88	0.787	268.2	0.445
25.32	0.786	283.8	0.437
26.82	0.782	300.6	0.415
28.38	0.781	318.6	0.402
30.06	0.773	337.2	0.382
31.86	0.767	357.6	0.366
33.72	0.762	378.6	0.352
35.76	0.765	400.8	0.332
37.86	0.753	424.8	0.319
40.08	0.745	450.	0.3
42.48	0.745	476.4	0.285
45.	0.736	504.6	0.271
47.64	0.734	534.6	0.251
50.46	0.726	566.4	0.238
53.46	0.723	600.2	0.218
56.64	0.714	636.	0.202
60.	0.709	672.	0.191
63.6	0.703	714.	0.178
67.2	0.696	756.	0.162
71.4	0.689	798.	0.141
75.6	0.682	846.	0.13
79.8	0.682	900.	0.113
84.6	0.667	948.	0.108

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
90.	0.659	1008.	0.089
94.8	0.652	1068.	0.077
100.8	0.643	1128.	0.07
106.8	0.63	1194.	0.061
112.8	0.618	1266.	0.049
119.4	0.617	1344.	0.044
126.6	0.601		

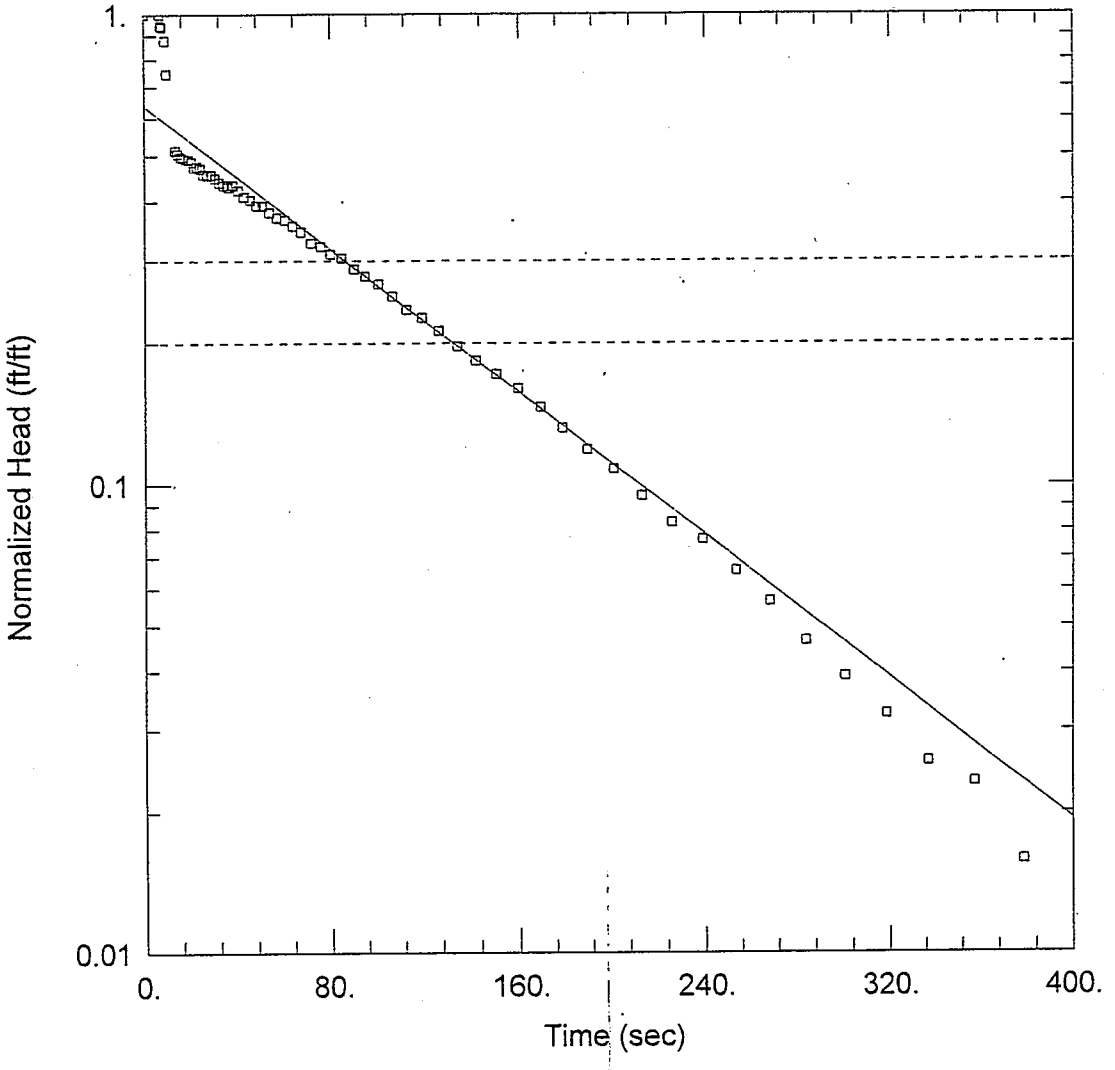
SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
Shape Factor: 2.85

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	6.254E-05	cm/sec
y0	0.7721	ft



WELL TEST ANALYSIS

Data Set: I:\Documents\2010\10-500\Corrective Action\Slug Tests\MW-R14\MW-R14.aqt
Date: 09/07/10 Time: 14:38:01

PROJECT INFORMATION

Company: Fehr-Graham & Associates
Client: Sauer Danfoss
Project: 10-500
Location: Ames, IA
Test Well: MW-R14
Test Date: 09/01/10

AQUIFER DATA

Saturated Thickness: 9.7 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-R14)

Initial Displacement: 1.204 ft
Total Well Penetration Depth: 8.7 ft
Casing Radius: 0.083 ft
Static Water Column Height: 8.7 ft
Screen Length: 10. ft
Wellbore Radius: 0.34 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.00104 cm/sec
y0 = 0.7679 ft

Data Set: I:\Documents\2010\10-500\Corrective Action\Slug Tests\MW-R14\MW-R14.aqt
Date: 09/07/10
Time: 14:38:06

PROJECT INFORMATION

Company: Fehr-Graham & Associates
Client: Sauer Danfoss
Project: 10-500
Location: Ames, IA
Test Date: 09/01/10
Test Well: MW-R14

AQUIFER DATA

Saturated Thickness: 9.7 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : MW-R14

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 1.204 ft
Static Water Column Height: 8.7 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.34 ft
Well Skin Radius: 0.34 ft
Screen Length: 10. ft
Total Well Penetration Depth: 8.7 ft
Corrected Casing Radius (Bouwer-Rice Method): 0.1846 ft
Gravel Pack Porosity: 0.25

No. of Observations: 63

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
6.721	1.204	67.2	0.416
7.141	1.137	71.4	0.394
7.561	1.131	75.6	0.387
9.001	1.059	79.8	0.373
9.481	0.899	84.6	0.366
13.44	0.618	90.	0.347
14.22	0.608	94.8	0.335
15.06	0.6	100.8	0.322
15.96	0.597	106.8	0.303
16.92	0.593	112.8	0.284
18.96	0.591	119.4	0.273
20.1	0.585	126.6	0.256
21.3	0.569	134.4	0.237
22.56	0.571	142.2	0.221
23.88	0.566	150.6	0.207
25.32	0.55	159.6	0.193
26.82	0.548	169.2	0.176
28.38	0.549	178.8	0.159
30.06	0.54	189.6	0.143
31.86	0.529	201.	0.13
33.72	0.522	213.	0.114
35.76	0.517	225.6	0.1
37.86	0.522	238.8	0.092
40.08	0.509	253.2	0.079
42.48	0.493	268.2	0.068
45.	0.486	283.8	0.056
47.64	0.473	300.6	0.047
50.46	0.472	318.6	0.039
53.46	0.457	337.2	0.031
56.64	0.446	357.6	0.028
60.	0.441	378.6	0.019
63.6	0.428		

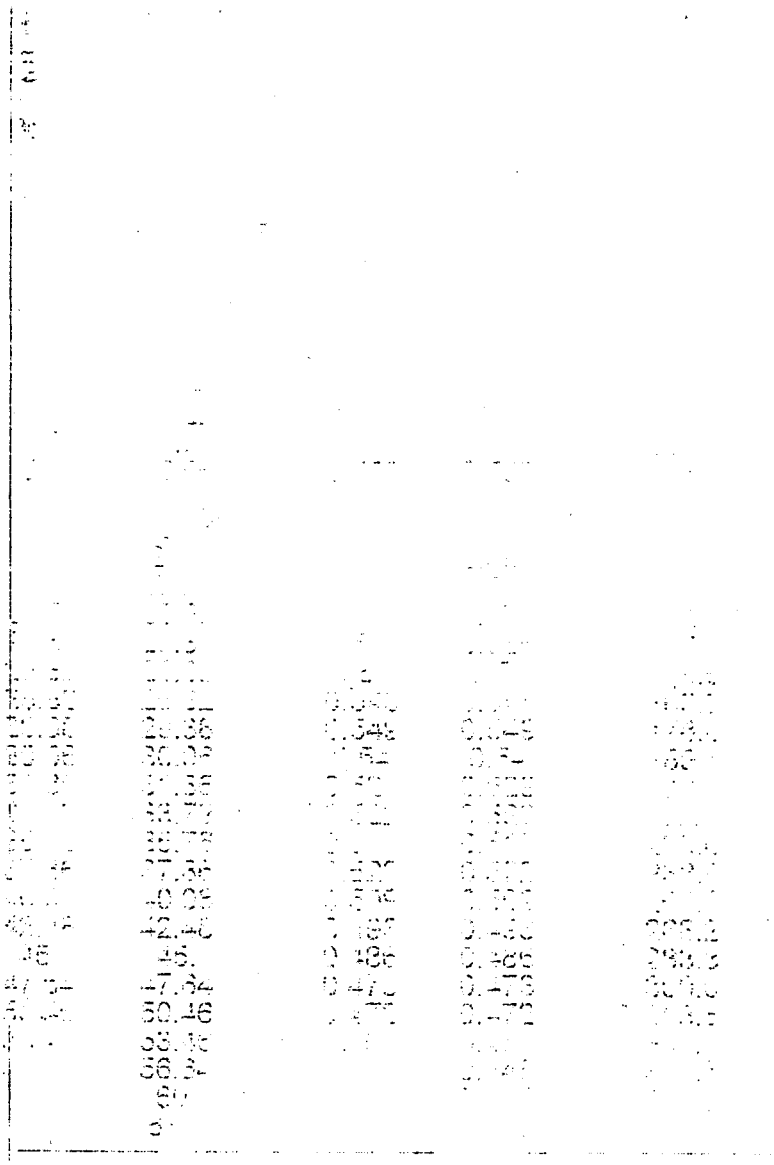
SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
Shape Factor: 2.292

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.00104	cm/sec
y0	0.7679	ft



Appendix D

FMC Documentation

Klozur® Activated Persulfate Demand Calculations

Environmental Solutions

November 23, 2010

Customer Fehr - Graham

Contact Jeff Ogden

Site Information	Value	Unit	Note
Area of Treatment	2,500	ft x ft	customer supplied
Treatment Zone Thickness	17	ft	customer supplied
Porosity	30	%	default value
Soil Volume	1,101.9	c.y.	calculated value
Ground Water Volume	95,382.8	gal	calculated value
Soil Density	3000	lb / c.y.	default value
Amount of Soil	1,652.8	tons	calculated value
Soil Oxidant Demand	1	g Klozur / kg soil	estimated value, it is recommend that this be analytically determined

Contaminant Information

Contaminant	Soil Concentration (ppm)	GW Concentration (ppm)	Calculated Total Contaminant Amount (lbs)
TCA	2.1	6.57	12.2
PCE	3.5	10.3	19.8
DCA	0.3	2.86	3.3
DCE	0.8	7.52	8.6
TCE	0.04	0.05	0.2
1,4-dioxane	0.3	0.092	1.1
vinyl chloride	0	0.07	0.1
methylene chloride	0	0.031	0.0

Klozur® Persulfate Demand		
Demand from contaminant	310	lb
Demand from SOD	3,306	lb
Total Klozur® Persulfate Demand	3,616	lb

Klozur® Persulfate Packaging Options and Pricing

All pricing is fob Tonawanda, NY. Quotes are valid for three months from date at top of document.

Available Packaging Types	# of packages / pallet	lb Klozur® / pallet	# of packages needed*
55 # bags	42	2310	66
1102 # super sacks	2	2204	4
2200 # super sacks	1	2200	2

* note: # of packages needed is rounded up to nearest whole unit

Available Packaging Types	Pricing ($ / lb)	Total lbs	Cost in USD (fob Tonawanda, NY)
55 # bags	[redacted]	3,630	[redacted]
1102 # super sacks	[redacted]	4,408	[redacted]
2200 # super sacks	[redacted]	4,400	[redacted]

freight rates available upon request

Klozur® persulfate and activator demand calculations are based on stoichiometry, and do not take into account the kinetics, or speed of the reaction, and represent the minimum anticipated amount needed to mineralize the contaminants. As a result, these calculations should be used as a general approximation for initial economic assessment. FMC recommends that oxidant demand and treatability testing be performed to verify the quantities of oxidant needed.

Klozur® Demand Calculations

Klozur® Activation Chemistry

Recommended methods to activated Klozur® Persulfate:	high pH	hydrogen peroxide

The choice of activation method is based on several factors, including contaminant type, hydrogeology, lithology and other site conditions. While activator demand quantities for all methods are given, not all method are recommended for your given contaminant or site conditions. Please consult with an FMC Environmental Solutions technologist for proper selection of activation chemistry.

*FMC Corporation is the owner or licensee under various patent applications relating to the use of activation chemistries

Klozur® Activation Chemistry

Iron not recommended for activation for chlorinated ethanes

Calculation for NaOH (high pH) demand:

NaOH demand = NaOH to neutralize generate HSO4 from persulfate decomposition + amount needed to raise ground water / soil to a pH of 11

NaOH for ground water / soil pH adjustment needs to be determined in the laboratory via titration.

NaOH demand for HSO4 neutralization	1,214.8	lb @ 100% basis	
FMC recommends using a 25 wt% or less NaOH concentration **			
Amount of 25 wt% solution needed	458.3	gal	+ titration amount
	4859.2	lb	+ titration amount
Klozur Caustic Pricing (25% NaOH solution)	[redacted]	$/lb	in 560 # drums
fob, Tonawanda, NY. Freight quote upon request	[redacted]	$/lb	in 2800 # totes

** note: the addition of concentrated NaOH to water is very exothermic. Add NaOH slowly to water, and allow for excess heat to dissipate.

Calculation for Hydrogen Peroxide demand:

demand based on the recommended peroxide to Klozur® persulfate mole ratic of:		5 : 1	
Hydrogen Peroxide demand		2,581.5	lb @ 100% basis
FMC recommends using a 17.5 wt% or less H2O2 concentration			
Amount of 17.5 wt% solution needed		1,668.7	gal
			delivered in:
Cost in USD (fob terminal)	[redacted]		bulk

FMC will soon be offering 17.5% hydrogen peroxide in drums. Please contact our FMC technical sales representative.

Appendix E

Quality Assurance/Quality Control Documentation

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Sauer Danfoss
TA Work Order #CTI0218

Case Narrative

All extractions and analyses were performed in accordance with laboratory standard operating procedures. There were no departures from quality control procedures, unless qualified as such.

8260 Volatiles (Batch #10I0436 – 10I0472)

Method Blank – No deviations

Laboratory Control Sample (LCS) – Acetone was above method control limits (177%, 166%). MS-MSD recoveries met the LCS criteria (128%, 134%)

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) – MS/MSD was out side of method control limits for cis-1,2-Dichloroethene, Tetrachloroethylene, and 1,1,1-Trichloroethane.

Sample surrogates – No deviations

Internal Standards – No deviations

Sample Dilutions – Dilutions were performed on CTI0218-03 and CTI0218-07 due high target analyte concentration

Clarification of Data Qualifier:

S2: The laboratory detected concentrations of Methylene Chloride below the laboratory reporting limit but above our method detection limit. This compound is a common laboratory solvent.

8260 Volatiles (Batch #10I0218)

Method Blank – No deviations

Laboratory Control Sample (LCS) – No Deviations

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) – No Deviations.

Sample surrogates – No deviations

Internal Standards – No deviations

TestAmerica – Cedar Falls
704 Enterprise Drive
Cedar Falls, IA 50613
(800) 740-2401 / (319) 277-2425 fax

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Clarification of Data Qualifier:

CIN: The relative standard deviation of the calibration curve for 1,1,1-Trichloroethane (17.5%) was above laboratory method requirements (<%15). The average relative standard deviation of calibrated compounds was less than 15%.

Inorganic Chemistry

There were no deviations observed during the analysis of samples for the following parameters: Alkanlinty, Hexavalent Chromium, Mercury, Nitrate, Sulfide, Total Organic Carbon, Total Solids, and 1,4-Dioxane.

ICP Metals – MS/MSD was outside of control limits in batch 10I0371 for Iron and Barium. Source sample for MS-MSD was not apart of this SDG. Data not impacted

GFAA Metals – MS/MSD was outside of control limits in batch 10I0303 for Arsenic. Source sample for MS-MSD was not apart of this SDG. Data not impacted

Nitrite - No deviations were observed except for the pH of the water after extraction was outside of method requirements for CTI0218-01, -02, and -06. No further deviations were incountered.

Sulfate – Reporting limits were elevated due to a matrix interferent that was observed during analysis. The laboratory analyzed samples CTI0218-01, CTI0218-02, and CTI0218-06 at a dilution to minimize this interferent. No further deviations were incountered.

pH – All samples were received and analyzed past method hold time. No further deviations were incountered.

TestAmerica – Cedar Falls
704 Enterprise Drive
Cedar Falls, IA 50613
(800) 740-2401 / (319) 277-2425 fax

Appendix F

Site Specific Health and Safety Plan

SITE-SPECIFIC HEALTH AND SAFETY PLAN

Prepared For:

SAUER-DANFOSS INC.
2800 EAST 13TH STREET
AMES, IOWA 50010

Prepared By:

FEHR-GRAHAM & ASSOCIATES, LLC
1920 DAIMLER ROAD
ROCKFORD, ILLINOIS 61112

NOVEMBER 2010

FGA PROJECT NUMBER: 10-500

SAUER-DANFOSS

AMES, IOWA

SITE-SPECIFIC HEALTH AND SAFETY PLAN

GENERAL INFORMATION

Project Name:	Sauer-Danfoss Ames, Iowa		
Location:	2800East 13th street		
Project Manager:	Joel Zirkle	Phone:	815-394-4700
Plan Prepared by:	Marjorie Veitch	Preparation Date:	Nov. 10, 2010
Plan Review by:	Jeff Ogden	Review Date:	
Brief Site History	General conclusions upon completion of this Corrective Action Plan include the design of a phased remediation approach using an injection grid approximately 2,500 sq feet to remediate volatile organic compounds (VOCs) including specific isomers and 1,4-Dioxane. To more aggressively address the source area, including and surrounding well MW-R13, it is proposed to conduct In-Situ Chemical Oxidation (ISCO) to remediate VOC-affected soil below the water table and site groundwater.		
Proposed Field Activities:	Conduct drilling, phased remediation injection using the sodium persulfate, Klozur® with sodium hydroxide activator, and soil and groundwater sampling.		

HAZARDOUS SUBSTANCES

Refer to Table E.1, which lists the Potential Hazardous Compounds.

Table E.1

Chemical	CAS Number	TWA	IDLH	Odor Threshold	Ionization Potential	Physical Description/Health Effects/Symptoms
PCE Tetrachloroethylene	127-18-04	100 ppm	Ca [150 ppm]	N/A	9.32 eV	Colorless liquid with a mild, chloroform-like odor. Reactive with strong oxidizers, chemically-active metals such as lithium, beryllium & barium, caustic soda, sodium hydroxide, potash. Noncombustible liquid, but decomposes in a fire to hydrogen chloride and phosgene. Routes of exposure: inhalation, absorption, ingestion, contact with eyes.
TCE Trichloroethylene	79-01-6	100 ppm	Ca [1000 ppm] Potential carcinogen	N/A	9.45 eV	Colorless liquid (unless dyed blue) with a chloroform-like odor. Combustible liquid, but burns with difficulty. Reactive with strong caustics & alkalis; chemically-active metals. Routes of exposure: inhalation, absorption, ingestion, contact with eyes.
TCA Trichloroethane	79-00-5	45 mg/m3	Ca [100 ppm]	N/A	11 eV	Colorless liquid with a sweet, chloroform-like odor. Reactive with strong oxidizers and caustics; chemically-active metals. Combustible liquid, forms dense soot. Routes of exposure: inhalation, absorption, ingestion, and contact with eyes.
1,1 Dichloroethane	75-34-3	400 mg/m3	3000 ppm	N/A	11.06 eV	Colorless, oily liquid with a chloroform-like odor. Reactive with strong oxidizers and strong caustics. Class 1B flammable liquid. Routes of exposure: inhalation, ingestion, contact with eyes.
1,2 Dichloroethene	540-59-0	790 mg/m3	1000 ppm	N/A	9.65 eV	Colorless liquid (usually a mixture of the cis & trans isomers) with a slightly acrid, chloroform-like odor. Class 1B flammable liquid. Reactive with strong oxidizers, strong alkalis, potassium hydroxide, copper [usually contains inhibitors to prevent polymerization.] Routes of exposure: inhalation, ingestion, contact with eyes.

Chemical	CAS Number	TWA	IDLH	Odor Threshold	Ionization Potential	Physical Description/Health Effects/Symptoms
1,1,2 Trichloroethane	79-00-5	45 mg/m3 [skin]	Ca [100 ppm]	N/A	11 eV	Colorless liquid with a sweet, chloroform-like odor. Combustible liquid, forms dense soot. Reactive with strong oxidizers & caustics; chemically-active metals. Routes of exposure: inhalation, absorption, ingestion, contact with eyes.
Chlorobenzene	108-90-7	350 mg/m3	1000 ppm	N/A	9.07 eV	Colorless liquid with an almond-like odor. Reactive with strong oxidizers. Routes of exposure: inhalation, ingestion, contact with eyes.
Toluene	108-88-3	375 mg/m3	500 ppm	N/A	8.82 eV	Colorless liquid with a sweet, pungent, benzene-like odor. Reactive with strong oxidizers. Exposure routes: inhalation, absorption, ingestion, contact with eyes.
Ethyl Benzene	100-41-4	435 mg/m3	800 ppm [10% LEL]	N/A	8.76 eV	Colorless liquid with an aromatic odor. Class 1B flammable liquid. Reactive with strong oxidizers. Routes of exposure: inhalation, ingestion, contact with eyes.
Xylene	1330-20-7	435 mg/m3	900 ppm	N/A	8.56 eV	Colorless liquid with an aromatic odor. Reactive with strong oxidizers and strong acids. Class 1C flammable liquid. Routes of exposure: inhalation, absorption, ingestion, contact with eyes.
Benzene	71-43-2	1 ppm	Ca [500 ppm]	N/A	9.24 eV	Colorless to light-yellow liquid with an aromatic odor [A solid below 42°F. Class 1B flammable liquid. Reactive with strong oxidizers, many fluorides & perchlorates, nitric acid. Routes of exposure: inhalation, absorption, ingestion, contact with eyes.
1,4-Dioxane	123-91-1	25 ppm	Ca [2000 ppm]	1 ppm	N/A	Clear, colorless, flammable liquid with a mild, pleasant, ether-like odor. Symptoms include drowsiness, headaches, nauseous, and vomiting. Routes of exposure: inhalation, absorption, ingestion, contact with eyes.

Chemical	CAS Number	TWA	IDLH	Odor Threshold	Ionization Potential	Physical Description/Health Effects/Symptoms
Sodium Hydroxide	1310-73-2	2 mg/m3	250 mg/m3	N/A	N/A	Colorless liquid. Both liquid and vapor can cause severe burns to all parts of the body by all exposure routes. Routes of exposure: inhalation, absorption, ingestion, contact with eyes. Target organs include respiratory system, gastrointestinal system, eyes, skin.

HAZARD EVALUATION

Hazardous Potential: (Low, Medium, High, Comments): Low to medium, if released

Level of Protection and Upgrade Values: Level D

PID READING (ppm)	MSA TUBE (ppm)	PROTECTION LEVEL
Background	NA	Level D
> Background <25	< 1	Level D
> Background < 25	≥ 1 < 10	Evacuate Area or Level C
> 25 < 50	≥ 1 < 10	Evacuate Area or Level C
> 25 < 50	≥ 10	Level B
≥ 50 < 500	≥ 10	Level B
≥ 500	NA	Evacuate Area

These action levels apply to all field work.

General Site Procedures:

The potential exists for exposure to contaminated soils, groundwater, and material used in conjunction with the injection of sodium persulfate, Klozur® with sodium hydroxide activator.

Duc to this risk, soils shall be continuously field screened by the Health and Safety Officer using a PID to evaluate total fuel vapor concentration. The same action levels shall be used for field screening of soil during excavation activities as those used for breathing zone levels. Observations of staining or other visual indications of contamination shall also be used as a basis for segregating soil as determined based upon the scope of work provided in the Site Specific Sampling and Analysis Plan. Segregated soils shall be placed on an impervious barrier of no less than 6 mil (.001 inches) thick. Samples shall be taken from segregated soil piles on a per station basis and disposed of in accordance with all local, state, and federal requirements.

There is risk of worker exposure to contaminated groundwater. During investigation activities, field determinations shall be made as to the quality of groundwater encountered based upon the field screening of soils in the immediate area using a PID. All purged water from monitoring wells will be containerized as described in the following section "Disposal Procedures."

There is risk of worker exposure to sodium persulfate, Klozur® with sodium hydroxide activator. Impervious protective clothing including: boots, gloves, coveralls, and use of chemical safety

goggles and/or full face shield should be used to limit all exposure to eyes, skin, or clothing during remediation injection efforts. Maintain eye wash fountain and quick drench facilities in work area, as appropriate. Use only in well-ventilated areas. Following eye exposure, immediately flush eyes with water for at least 15 minutes, occasionally lifting upper and lower eyelids. Following skin exposure, immediately flush skin with water for at least 15 minutes while removing contaminated clothing and shoes. Following ingestion, do not induce vomiting, get medical attention immediately: call poison control center. Following inhalation exposure, remove from exposure to fresh air immediately. If breathing is difficult, give oxygen. Induce artificial respiration with the aid of pocket mask equipped with a one-way valve or other proper respiratory device.

Personal Protective Equipment: Hard hats, steel-toe boots, work clothes, hearing protection, disposable gloves during sample handling procedures. During remediation injection efforts wear impervious protective clothing, including boots, gloves, coveralls, as appropriate, to prevent skin contact. Use chemical safety goggles and/or full face shield where splashing is possible. Maintain eye wash fountain and quick drench facilities in work area, as appropriate.

Monitoring Equipment: Photoionization Detector (PID) is to be calibrated every morning with isobutylene span gas. Soil samples will be monitored.

Site Control Procedures: Only 40-Hour OSHA-certified workers allowed in exclusion zone. No smoking, eating, or drinking in exclusion zone. Hardhat must be worn within 50 feet of heavy equipment. Caution tape and or safety cones should be used to mark the location of the exclusion zone. Subsurface utilities should be marked by notifying "JULIE" prior to any drilling/excavation activities. Maintain safe distance from power lines and railroad tracks.

Disposal Procedure: Investigative derived waste (IDW), including decontamination water contaminated excavated material, and excess sample materials, generated from the sampling and construction efforts will be containerized and stored in a secure location on site, to await final disposition along with other IDW materials to be generated in the future. Each container will be marked with the date, contents, and source of contents.

PHYSICAL HAZARDS

ACTIVITY	POTENTIAL HAZARD	PRECAUTION MEASURES
Drilling	Drill through underground utilities	Clear utilities with local contacts before drilling.
	Potential impact from falling objects	Use proper personal protective clothing. Proper handling of equipment. Refer to 20 CPR 1926.251.
Drilling (continued)	Lacerations and contusions from moving machinery and physical objects	Person certified in first aid and first aid kit on site.
	Injury from impact from motor vehicles and heavy equipment	Regular vehicle inspections and necessary safety items on equipment. Refer to 29 CFR 1926.600 to 1926.602.
	Slip, trip, and fall hazards	Constant awareness, signs, signals, and barricades. Refer to 29 CPR 1926.200 to 1926.202.
Soil and Groundwater Sampling	Noise-induced hearing loss	Use earmuff or foam earplugs.
	Overhead power lines	Ensure clear path for drill rig tower (minimum of 10 feet).
	Cold-heat stress	Monitoring, keep clothing dry.
	Slip, trip, and fall hazards	Constant awareness, signs, signals, and "barricades. Refer to 29 CFR 1926.200 to 1926.202.
	Lacerations and contusions	Person certified in first aid and first aid kit on site.
	Lifting hazards	Training in proper lifting techniques and constant awareness.
Injection using the sodium persulfate, Klozur® with sodium hydroxide activator.	Skin protection	Wear impervious protective clothing, including boots, gloves, coveralls, as appropriate to prevent skin contact.

Eye protection	Use chemical safety goggles and/or full face shield where splashing is possible. Maintain eye wash fountain and quick drench facilities in work area.
Inhalation /ingestion	Use only in well ventilated area.
Cold-heat stress	Monitoring, keep clothing dry.
Slip, trip, and fall hazards	Constant awareness, signs, signals, and "barricades. Refer to 29 CFR 1926.200 to 1926.202.
Lacerations and contusions	Person certified in first aid and first aid kit on site.
Lifting hazards	Training in proper lifting techniques and constant awareness.

EMERGENCY RESPONSE

Emergency Procedures: Designated H&S officer is responsible for all H&S procedures on site. Personnel should be aware of and report the occurrence of these symptoms: irritation of eyes, nose, or respiratory system; giddiness; light-headed; nausea; staggered gate; fatigue; depression; abdominal pain.

EMERGENCY SERVICES:

Location	Name	Telephone
Emergency Medical Facility	Mary Greeley Medical Center	
	1111 Duffy Ave.	911
	Ames, IA	
	Non-emergency	515-239-2011
Route to Hospital	See attached Map	
Ambulance Service	Mary Greeley Medical Center	911
Fire Department	City of Ames Fire Department	911
Police Department	City of Ames Fire Department	911
	Non-emergency	515-239-5108
IA Poison Control Center		800-222-1222
Site Contact:	Jeff Ogden	815-541-0176

AUTHORIZED PERSONEL:

Position	Name	Phone
Site H&S Officer	Jeff Ogden	815-541-0176
Site Personnel	Jeff Ogden	815-541-0176
Office H&S Officer	Joel Zirkle	815-394-4700
Project Manager	Joel Zirkle	815-394-4700
Office Manager	Joel Zirkle	815-394-4700

SITE-SPECIFIC HEALTH AND SAFETY PLAN ACCEPTANCE FORM

I have been instructed of the potential hazards at this site and agree to abide by the contents of this Site-Specific Health and Safety Plan.

Name (Print)	Signature	Company	Date

Route to Hospital from Site

MAPQUEST.

Notes

Trip to 1111 Duff Ave

Ames, IA 50010-5745
2.37 miles - about 5 minutes

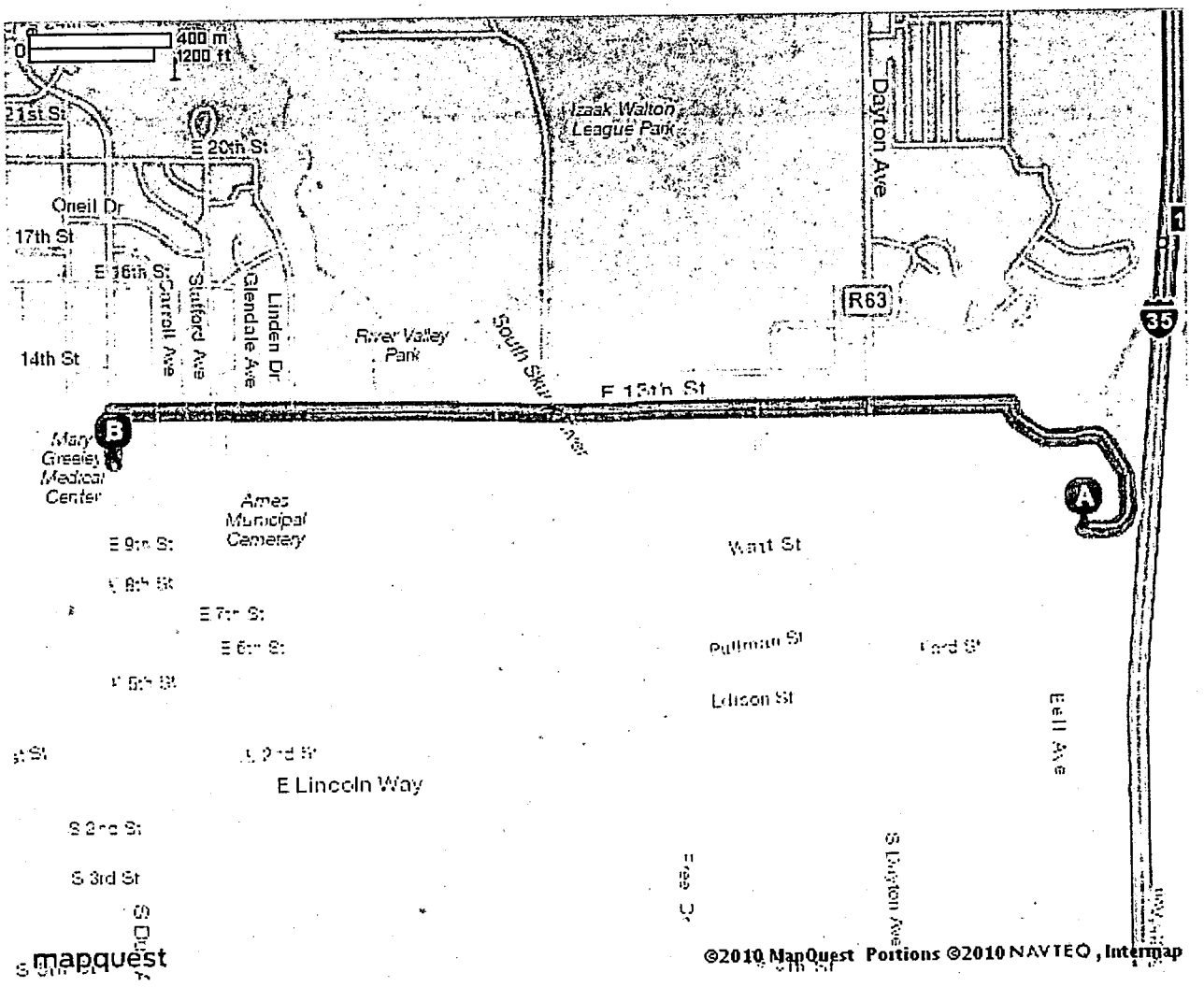
A 2800 E 13th St, Ames, IA 50010-8600

START	1. Start out going **NORTHWEST** on **E 13TH ST.**	go 0.5 mi
↰	2. Turn **LEFT** to stay on **E 13TH ST.**	go 1.8 mi
↰	3. Turn **LEFT** onto **DUFF AVE / I-35 BL.**	go 0.1 mi
END	4. **1111 DUFF AVE** is on the **RIGHT.**	go 0.0 mi

B 1111 Duff Ave, Ames, IA 50010-5745

Total Travel Estimate : 2.37 miles - about 5 minutes

Route Map Hide



Occupational Safety and Health Guideline for Dioxane

DISCLAIMER:

These guidelines were developed under contract using generally accepted secondary sources. The protocol used by the contractor for surveying these data sources was developed by the National Institute for Occupational Safety and Health (NIOSH), the Occupational Safety and Health Administration (OSHA), and the Department of Energy (DOE). The information contained in these guidelines is intended for reference purposes only. None of the agencies have conducted a comprehensive check of the information and data contained in these sources. It provides a summary of information about chemicals that workers may be exposed to in their workplaces. The secondary sources used for supplements 111 and 1V were published before 1992 and 1993, respectively, and for the remainder of the guidelines the secondary sources used were published before September 1996. This information may be superseded by new developments in the field of industrial hygiene. Therefore readers are advised to determine whether new information is available.

Introduction | Recognition | Controls | References

Introduction

This guideline summarizes pertinent information about dioxane for workers and employers as well as for physicians, industrial hygienists, and other occupational safety a health professionals who may need such information to conduct effective occupational safety and health programs. Recommendations may be superseded by new developments in these fields; readers are therefore advised to regard these recommendations as general guidelines and to determine whether new information is availat

Recognition

SUBSTANCE IDENTIFICATION

* Formula
C(4)H(8)O(2)

* Structure
(For Structure, see paper copy)

* Synonyms

Diethylene dioxide; diethylene ether; 1,4-dioxacyclohexane; diethylene oxide; dioxyethylene ether; glycol ethylene ether; p-dioxane; 1,4-dioxane

* Identifiers

1. CAS No.: 123-91-1
2. RTECS No.: JG8225000
3. DOT UN: 1165 26
4. DOT label: Flammable Liquid

* Appearance and odor

Dioxane is a clear, colorless, flammable liquid with a mild, pleasant, ether-like odor. An air odor threshold concentration of 24 parts per million (ppm) parts of air has bee reported.

CHEMICAL AND PHYSICAL PROPERTIES

* Physical data

1. Molecular weight: 88.1
2. Boiling point (at 760 mm Hg): 101 degrees C (213.8 degrees F)
3. Specific Gravity (water = 1): 1.03
4. Vapor density (air = 1 at boiling point of dioxane) 3.0
5. Melting point: 11.8 degrees C (53 degrees F)
6. Vapor pressure at 20 degrees C (68 degrees): 29 mm Hg
7. Solubility: Miscible with water, acetone, alcohols, ether, benzene, and many common solvents.
8. Evaporation rate: Data not available.

* Reactivity

1. Conditions contributing to instability: Heat, sunlight, or flame.
2. Incompatibilities: Contact of dioxane with oxidizing agents. It reacts violently with hydrogen in the presence of Raney nickel (above 210 degrees C (410 degrees F with decaborane, which is impact-sensitive; with triethynylaluminum, which is sensitive to heating or drying; and with sulfur trioxide. There is a potentially explos

reaction with nitric acid in the presence of perchloric acid.
3. Hazardous decomposition products: Toxic vapors (such as carbon monoxide) may be released in a fire involving dioxane when dioxane undergoes thermal oxidative degradation.
4. Special precautions: Dioxane is hydroscopic and will produce peroxides in the presence of moisture. Dioxane-containing peroxides should not be distilled to dryness because of the potential explosion of non-volatile peroxides.

* Flammability

The National Fire Protection Association has assigned a flammability rating of 3 (severe fire hazard) to dioxane.

1. Flash point: 18.3 degrees C (65 degrees F) (open cup)
2. Auto-ignition temperature: 180 degrees C (356 degrees F)
3. Flammable limits in air (percent by volume): Lower, 2.0; upper, 22
4. Extinguishant: Dry chemical, carbon dioxide, or alcohol foam. Water spray may be ineffective in extinguishing fire but should be used to cool fire-exposed containers, to dilute and disperse vapors and liquid that have not ignited, and to protect persons attempting to stop the leak.

Fires involving dioxane should be fought upwind from the maximum distance possible. Keep unnecessary people away; isolate the hazard area and deny entry. Isolate the area for 1/2 mile in all directions if a tank, rail car, or tank truck is involved in the fire. For a massive fire in a cargo area, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from the area and let the fire burn. Emergency personnel should stay out of low areas and ventilate closed spaces before entering. Vapors may travel to a source of ignition and flash back. Vapors are an explosion and poison hazard indoors, outdoors, or in sewers. Containers of dioxane may explode in the heat of the fire and should be moved from the fire area if it is possible to do so safely. If this is not possible, cool fire exposed containers from the sides with water until well after the fire is out. Do not get water inside the containers. Stay away from the ends of containers. Personnel should withdraw immediately if a rising sound from a venting safety device is heard or if there is discoloration of a container due to fire. Firefighters should wear a full set of protective clothing and self-contained breathing apparatus when fighting fires involving dioxane.

EXPOSURE LIMITS

* OSHA PEL

The current Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) for dioxane is 100 ppm (360 milligrams per cubic meter (mg/m(3))) as an 8-hour time-weighted average (TWA) concentration. The OSHA PEL also bears a "Skin" notation, which indicates that the cutaneous route of exposure (including mucous membranes and eyes) contributes to overall exposure [29 CFR 1910.1000, Table Z-1].

* NIOSH REL

The National Institute for Occupational Safety and Health (NIOSH) has established a recommended exposure limit (REL) for dioxane of 1 ppm (3.6 mg/m(3)) as a 30-minute ceiling. NIOSH also considers dioxane a potential occupational carcinogen [NIOSH 1992].

* ACGIH TLV

The American Conference of Governmental Industrial Hygienists (ACGIH) has assigned dioxane a threshold limit value (TLV) of 25 ppm (90 mg/m(3)) as a TWA for a normal 8-hour workday and a 40-hour workweek. The ACGIH also assigns a "Skin" notation to dioxane [ACGIH 1994, p. 20].

* Rationale for Limits

The NIOSH limit is based on the risk of potential for cancer, liver and kidney effects, and on the liver, lung, and nasal cavity tumors noted in animals [NIOSH 1992].

The ACGIH limit is based on the risk of liver and kidney effects and on the potential for absorption of toxic quantities through the skin [ACGIH 1991, p. 513].

HEALTH HAZARD INFORMATION

* Routes of Exposure

Exposure to dioxane can occur through inhalation, ingestion, and eye or skin contact, and absorption through the skin [Sittig 1991, p. 676].

* Summary of toxicology

1. Effects on Animals: Dioxane is moderately toxic by inhalation and ingestion and mildly toxic by skin absorption. The oral LD(50) in rats is 4,200 mg/kg. The inhalation LC(50) for the same species is 46 g/m(3) for 2 hours. The dermal LD(50) in rabbits is 7,600 mg/kg [Sax and Lewis 1989]. Guinea pigs tolerate exposure to 2,000 ppm for several hours without symptoms [NLM 1992]. Guinea pigs exposed to 30,000 ppm dioxane developed narcosis within 3 hours and died within 2 days [Hathaway et al. 1991]. Animals exposed to 1,000 ppm for 3 hours a day for a total of 100 hours developed kidney and liver damage [Hathaway et al. 1991; ACGIH 1991]. Dogs fed a total of 3 g/kg of dioxane over a 9-day period died. A post-mortem examination revealed severe liver and kidney damage [ACGIH 1991]. Animals dying after acute exposures have shown injury to the brain, stomach, kidneys, and liver; respiratory failure is usually the cause of death [Clayton and Clayton 1982]. Liquid dioxane applied to rabbit and guinea pig skin is rapidly absorbed, producing incoordination and narcosis [Hathaway et al. 1991; Parmeggiani 1983]. Kidney and livery damage occurred in animals repeatedly exposed by application of dioxane to the skin [Clayton and Clayton 1982]. Dioxane applied to rabbit's eyes caused hyperemia and purulent conjunctivitis [Hathaway et al. 1991]. Dioxane is carcinogenic in rats and guinea pigs by oral administration, producing malignant tumors of the nasal cavity and liver in rats of both sexes, and tumors of the liver and gall bladder in male guinea pigs [Hathaway et al. 1991; ACGIH 1991]. The International Agency for Research on Cancer (IARC) considers the evidence for the carcinogenicity of dioxane to be sufficient in experimental animals [IARC 1987]. Dioxane is not mutagenic in bacterial test systems [NLM 1992].
2. Effects on Humans: Dioxane is an irritant of the eyes and mucous membranes. Prolonged exposure to dioxane is toxic to the liver and kidney. Exposure to concentrations of 300 ppm for 15 minutes caused transient eye, nose and throat irritation [Hathaway et al. 1991]. At 1,600 ppm, subjects reported burning of the eyes, and tearing after 10 minutes. Five workers died after an exposure to dioxane described as "heavy"; signs and symptoms included stomach pain, vomiting, anorexia, scanty urine, and coma. Autopsy revealed liver and kidney damage and edema of the lungs and brain. Another worker exposed for 1 week to a concentration of 208 to 605 ppm died after experiencing gastrointestinal pain, convulsions, and an increase in blood pressure; skin absorption may have contributed to this worker's overall exposure [Hathaway et al. 1991]. Chronic contact with liquid dioxane may cause dermatitis [Clayton and Clayton 1982]. An epidemiological study of workers exposed to levels of dioxane as high as 24 ppm for as long as 50 years has not shown an excess of cancer or other chronic disease [Hathaway et al. 1991]. IARC has determined that the data for evaluating the carcinogenicity of dioxane to humans is inadequate [IARC 1987].

* Signs and symptoms of exposure

1. Acute exposure: Acute exposure to dioxane results in irritation of the eyes, nose, throat, and lungs. Persons exposed acutely may develop headache, dizziness, and drowsiness, and may have difficulty breathing. There can be nausea, vomiting, loss of appetite, stomach pain, kidney failure, and liver damage [Sittig 1991; Genium 1989].
2. Chronic exposure: Chronic dermal exposure may result in irritation, dermatitis, eczema, drying, and cracking of the skin. Chronic, low dose exposure to dioxane may damage the liver and kidneys [Sitting 1991; Clayton and Clayton 1982; Sax and Lewis 1989].

EMERGENCY MEDICAL PROCEDURES

* Emergency medical procedures: [NIOSH to supply]

Rescue: Remove an incapacitated worker from further exposure and implement appropriate emergency procedures (e.g., those listed on the Material Safety Data Sheet required by OSHA's Hazard Communication Standard [29 CFR 1910.1200]). All workers should be familiar with emergency procedures, the location and proper use of emergency equipment, and methods of protecting themselves during rescue operations.

EXPOSURE SOURCES AND CONTROL METHODS

The following operations may involve dioxane and lead to worker exposures to this substance:

- The manufacture and transportation of dioxane
- Use as a solvent for fats, oils, ethyl cellulose, benzyl cellulose, cellulose acetate, and other cellulose esters and ethers, dyes, paints, polyvinyl polymers, varnishes, waxes, greases, natural and synthetic resins, and in the pulping of wood
- Use in paint and varnish strippers and as a degreaser
- Use as a wetting and dispersing agent in textile processing, dye baths, and stain and printing compositions
- Use in manufacture of detergents, adhesives, fumigants, emulsions, and cleaning preparations, and in manufacture of polishing compounds
- Use as a stabilizer for chlorinated solvents; in preparation of cosmetics and deodorants; and in purification of drugs
- Use as a working fluid for scintillation counter samples; for radioimmunoassay of glucagon; in molecular weight determinations; as a solvent to purify organic compounds; and as a dehydrating agent of histological slides

Methods that are effective in controlling worker exposures to dioxane, depending on the feasibility of implementation, are as follows:

- Process enclosure
- Local exhaust ventilation
- General dilution
- Ventilation
- Personal protective equipment

Workers responding to a release or potential release of a hazardous substance must be protected as required by paragraph (q) of OSHA's Hazardous Waste Operations a Emergency Response Standard [29 CFR 1910.120].
Good sources of information about control methods are as follows:

1. ACGIH [1992]. Industrial ventilation--a manual of recommended practice. 21st ed. Cincinnati, OH: American Conference of Governmental Industrial Hygienists.
2. Burton DJ [1986]. Industrial ventilation--a self study companion. Cincinnati, OH: American Conference of Governmental Industrial Hygienists.
3. Alden JL, Kane JM [1982]. Design of industrial ventilation systems.
4. New York, NY: Industrial Press, Inc.
5. Wadden RA, Scheff PA [1987]. Engineering design for control of workplace hazards. New York, NY: McGraw-Hill.
6. Plog BA [1988]. Fundamentals of industrial hygiene. Chicago, IL: National Safety Council.

Controls

MEDICAL SURVEILLANCE

OSHA is currently developing requirements for medical surveillance. When these requirements are promulgated, readers should refer to them for additional information a to determine whether employers whose employees are exposed to dioxane are required to implement medical surveillance procedures.

* Medical Screening

Workers who may be exposed to chemical hazards should be monitored in a systematic program of medical surveillance that is intended to prevent occupational injury a disease. The program should include education of employers and workers about work-related hazards, early detection of adverse health effects, and referral of workers f diagnosis and treatment. The occurrence of disease or other work-related adverse health effects should prompt immediate evaluation of primary preventive measures (e industrial hygiene monitoring, of engineering controls, and personal protective equipment). A medica of surveillance program is intended to supplement, not replace, suc measures. To detect and control work-related health effects, medical of evaluations should be performed (1) before job placement, (2) of periodically during the term of employment, and (3) at the time of job transfer or termination.

* Pre-placement medical evaluation

Before a worker is placed in a job with a potential for exposure to dioxane, a licensed health care professional should evaluate and document the worker's baseline healt status with thorough medical, environmental, and occupational histories, a physical examination, and physiologic and laboratory tests appropriate for the anticipated occupational risks. These should concentrate on the function and integrity of the skin, liver, and kidneys.

A pre-placement medical evaluation is recommended to assess medical conditions that may be aggravated or may result in increased risk when a worker is exposed to dioxane at or below the prescribed exposure limit. The health care professional should consider the probable frequency, intensity, and duration of exposure as well as th nature and degree of any applicable medical condition. Such conditions (which should not be regarded as absolute contraindications to job placement) include a history a other findings consistent with diseases of the skin, liver, and kidneys.

* Periodic medical evaluations

Occupational health interviews and physical examinations should be performed at regular intervals during the employment period, as mandated by any applicable Federa State, or local standard. Where no standard exists and the hazard is minimal, evaluations should be conducted every 3 to 5 years or as frequently as recommended by a experienced occupational health physician. Additional examinations may be necessary if a worker develops symptoms attributable to dioxane exposure. The interviews, examinations, and medical screening tests should focus on identifying the adverse effects of dioxane on the skin, liver, or kidneys. Current health status should be compared with the baseline health status of the individual worker or with expected values for a suitable reference population.

* Termination medical evaluations

The medical, environmental, and occupational history interviews, the physical examination, and selected physiologic or laboratory tests that were conducted at the time placement should be repeated at the time of job transfer or termination to determine the worker's medical status at the end of his or her employment. Any changes in th worker's health status should be compared with those expected for a suitable reference population. Because occupational exposure to dioxane may cause diseases with prolonged latent periods, the need for medical surveillance may extend well beyond the termination of employment.

* Biological monitoring

Biological monitoring involves sampling and analyzing body tissues or fluids to provide an index of exposure to a toxic substance or metabolite. Dioxane or its metabolite

beta-hydroxyethoxy acetic acid (HEAA) can be measured in the plasma. However, a more convenient procedure involves the determination of dioxane or HEAA in urine collected at the end of the shift. According to the kinetics of dioxane elimination, dioxane should not be detectable and HEAA should be present at very low levels in the urine collected just before the start of the shift in workers who are exposed on a daily basis to 50 ppm dioxane. Analysis of the samples can be performed by flame ionization gas chromatography.

WORKPLACE MONITORING AND MEASUREMENT

Determination of a worker's exposure to airborne dioxane is made using a charcoal tube (100/50 mg sections, 20/40 mesh). Samples are collected at a maximum flow rate of 0.2 liter/minute until a maximum collection volume of 15 liters is reached. The sample is then treated with 95:5 methylene chloride:methanol. Analysis is conducted by gas chromatography using a flame ionization detector (GC/FID). This method is described in the OSHA Computerized Information System [OSHA 1994] and is fully validated (it is based on the NIOSH Method No. 1602). NIOSH Method No. 1602 for dioxane is similar to the method described above except that it relies on carbon disulfide to extract the sample [NIOSH 1994].

PERSONAL HYGIENE PROCEDURES

If dioxane contacts the skin, workers should flush the affected areas immediately with plenty of water, followed by washing with soap and water. Clothing contaminated with dioxane should be removed immediately, and provisions should be made for the safe removal of the chemical from the clothing. Persons laundering the clothes should be informed of the hazardous properties of dioxane.

A worker who handles dioxane should thoroughly wash hands, forearms, and face with soap and water before eating, using tobacco products, using toilet facilities, applying cosmetics, or taking medication.

Workers should not eat, drink, use tobacco products, apply cosmetics, or take medication in areas where dioxane or a solution containing dioxane is handled, processed, or stored.

STORAGE

Dioxane should be stored in a cool, dry, well-ventilated area in tightly sealed containers that are labeled in accordance with OSHA's Hazard Communication Standard [29 CFR 1910.1200]. Containers of dioxane should be protected from physical damage, and sources of heat or ignition and should be stored separately from oxidizing agents.

SPILLS AND LEAKS

In the event of a spill or leak involving dioxane, persons not wearing protective equipment and fully-encapsulating, vapor-protective clothing should be restricted from contaminated areas until cleanup has been completed. The following steps should be undertaken following a spill or leak:

1. Notify safety personnel.
2. Remove all sources of heat and ignition.
3. Do not touch the spilled material; stop the leak if it is possible to do so without risk.
4. Use non-sparking tools.
5. Water spray may be used to reduce vapors, but the spray may not prevent ignition in closed spaces. Do not flush spilled dioxane into sewers, waterways, or watersheds.
6. For small liquid spills, take up with sand or other noncombustible absorbent material and place into closed containers for later disposal.
7. For large liquid spills, build dikes far ahead of the spill to contain the dioxane for later reclamation or disposal.

SPECIAL REQUIREMENTS

U.S. Environmental Protection Agency (EPA) requirements for emergency planning, reportable quantities of hazardous releases, community right-to-know, and hazardous waste management may change over time. Users are therefore advised to determine periodically whether new information is available.
* Emergency planning requirements

Dioxane is not subject to EPA emergency planning requirements under the Superfund Amendments and Reauthorization Act (SARA) (Title III) in 42 USC 11022.

* Reportable quantity requirements for hazardous releases

A hazardous substance release is defined by EPA as any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of contaminated containers) of hazardous substances. In the event of a release that is above the reportable quantity for that chemical, employers are required to notify the proper Federal, State, and local authorities [40 CFR 355.40].

The reportable quantity of dioxane is 100 pounds. If an amount equal to or greater than this quantity is released within a 24-hour period in a manner that will expose persons outside the facility, employers are required to do the following:

- Notify the National Response Center **immediately** at (800) 424-8802 or at (202) 426-2675 in Washington, D.C. [40 CFR 302.6].

* Community right-to-know requirements

Employers who own or operate facilities in SIC codes 20 to 39 that employ 10 or more workers and that manufacture 25,000 pounds or more of dioxane per calendar year or otherwise use 10,000 pounds or more of dioxane per calendar year are required by EPA [40 CFR Part 372.30] to submit a Toxic Chemical Release Inventory form (Form R) to EPA reporting the amount of dioxane emitted or released from their facility annually.

* Hazardous waste management requirements

EPA considers a waste to be hazardous if it exhibits any of the following characteristics: ignitability, corrosivity, reactivity, or toxicity as defined in 40 CFR 261.21-261.24. Under the Resource Conservation and Recovery Act (RCRA) [40 USC 6901 et seq.], EPA has specifically listed many chemical wastes as hazardous. Dioxane is listed as a hazardous waste under RCRA and has been assigned EPA Hazardous Waste No. U108. It is approved for land disposal after treatment and only if the concentration of dioxane in the waste or treatment residual does not exceed 170 mg/kg.

Providing detailed information about the removal and disposal of specific chemicals is beyond the scope of this guideline. The U.S. Department of Transportation, EPA, and State and local regulations should be followed to ensure that removal, transport, and disposal of this substance are conducted in accordance with existing regulations. To be certain that chemical waste disposal meets EPA regulatory requirements, employers should address any questions to the RCRA hotline at (703) 412-9810 (in the Washington, D.C. area) or toll-free at (800) 424-9346 (outside Washington, D.C.). In addition, relevant State and local authorities should be contacted for information on any requirements they may have for the waste removal and disposal of this substance.

RESPIRATORY PROTECTION

* Conditions for respirator use

Good industrial hygiene practice requires that engineering controls be used where feasible to reduce workplace concentrations of hazardous materials to the prescribed exposure limit. However, some situations may require the use of respirators to control exposure. Respirators must be worn if the ambient concentration of dioxane exce prescribed exposure limits. Respirators may be used (1) before engineering controls have been installed, (2) during work operations such as maintenance or repair activi that involve unknown exposures, (3) during operations that require entry into tanks or closed vessels, and (4) during emergencies. Workers should only use respirators t have been approved by NIOSH and the Mine Safety and Health Administration (MSHA).

* Respiratory protection program

Employers should institute a complete respiratory protection program that, at a minimum, complies with the requirements of OSHA's Respiratory Protection Standard [29 CFR 1910.134]. Such a program must include respirator selection, an evaluation of the worker's ability to perform the work while wearing a respirator, the regular trainir of personnel, respirator fit testing, periodic workplace monitoring, and regular respirator maintenance, inspection, and cleaning. The implementation of an adequate respiratory protection program (including selection of the correct respirator) requires that a knowledgeable person be in charge of the program and that the program be evaluated regularly. For additional information on the selection and use of respirators and on the medical screening of respirator users, consult the latest edition of the NIOSH Respirator Decision Logic [NIOSH 1987b] and the NIOSH Guide to Industrial Respiratory Protection [NIOSH 1987a].

PERSONAL PROTECTIVE EQUIPMENT

Workers should use appropriate personal protective clothing and equipment that must be carefully selected, used, and maintained to be effective in preventing skin cont with dioxane. The selection of the appropriate personal protective equipment (PPE) (e.g., gloves, sleeves, encapsulating suits) should be based on the extent of the worker's potential exposure to dioxane. The resistance of various materials to permeation by dioxane is shown below:

Material	Breakthrough time (hr)
Chemrel	>8
Butyl Rubber	>4
Teflon	>4
4H (PE/EVAL)	>4
Natural Rubber	<1(*)
Neoprene	<1(*)
Nitrile Rubber	<1(*)
Polyethylene	<1(*)
Polyvinyl Chloride	<1(*)
Polyvinyl Alcohol	<1(*)
Viton	<1(*)
Saranex	<1(*)

(*) Not recommended, degradation may occur

To evaluate the use of these PPE materials with dioxane, users should consult the best available performance data and manufacturers' recommendations. Significant differences have been demonstrated in the chemical resistance of generically similar PPE materials (e.g., butyl) produced by different manufacturers. In addition, the chemical resistance of a mixture may be significantly different from that of any of its neat components.

Any chemical-resistant clothing that is used should be periodically evaluated to determine its effectiveness in preventing dermal contact. Safety showers and eye wash stations should be located close to operations that involve dioxane.

Splash-proof chemical safety goggles or face shields (20 to 30 cm long, minimum) should be worn during any operation in which a solvent, caustic, or other toxic substa may be splashed into the eyes.

In addition to the possible need for wearing protective outer apparel (e.g., aprons, encapsulating suits), workers should wear work uniforms, coveralls, or similar full-boc coverings that are laundered each day. Employers should provide lockers or other closed areas to store work and street clothing separately. Employers should collect wo clothing at the end of each work shift and provide for its laundering. Laundry personnel should be informed about the potential hazards of handling contaminated clothin and instructed about measures to minimize their health risk.

Protective clothing should be kept free of oil and grease and should be inspected and maintained regularly to preserve its effectiveness.

Protective clothing may interfere with the body's heat dissipation, especially during hot weather or during work in hot or poorly ventilated work environments.

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MATERIAL SAFETY DATA SHEET

Klozür™

MSDS Ref. No.: 7775-27-1-12
Date Approved: 02/22/2005
Revision No.: 1

This document has been prepared to meet the requirements of the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200; the Canada's Workplace Hazardous Materials Information System (WHMIS) and, the EC Directive, 2001/58/EC.

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:	Klozür™
SYNONYMS:	Sodium Persulfate, Sodium Peroxydisulfate; Disodium Peroxydisulfate
GENERAL USE:	In situ and ex situ chemical oxidation of contaminants and compounds of concern for environmental remediation applications.

MANUFACTURER

FMC CORPORATION
Active Oxidants Division
1735 Market Street
Philadelphia, PA 19103
(215) 299-6000 (General Information)

EMERGENCY TELEPHONE NUMBERS

(800) 424-9300 (CHEMTREC - U.S.)
(303) 595-9048 (Medical - Call Collect)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

- White, odorless, crystals
- Oxidizer.
- Decomposes in storage under conditions of moisture (water/water vapor) and/or excessive heat causing release of oxides of sulfur and oxygen that supports combustion. Decomposition could form a high temperature melt. See Section 10 ("Stability and Reactivity").

POTENTIAL HEALTH EFFECTS: Airborne persulfate dust may be irritating to eyes, nose, lungs, throat and skin upon contact. Exposure to high levels of persulfate dust may cause difficulty in breathing in sensitive persons.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Wt.%	EC No.	EC Class
Sodium Persulfate	7775-27-1	>99	231-892-1	Not classified as hazardous

4. FIRST AID MEASURES

EYES: Flush with plenty of water. Get medical attention if irritation occurs and persists.

SKIN: Wash with plenty of soap and water. Get medical attention if irritation occurs and persists.

INGESTION: Rinse mouth with water. Dilute by giving 1 or 2 glasses of water. Do not induce vomiting. Never give anything by mouth to an unconscious person. See a medical doctor immediately.

INHALATION: Remove to fresh air. If breathing difficulty or discomfort occurs and persists, contact a medical doctor.

NOTES TO MEDICAL DOCTOR: This product has low oral toxicity and is not irritating to the eyes and skin. Flooding of exposed areas with water is suggested, but gastric lavage or emesis induction for ingestions must consider possible aggravation of esophageal injury and the expected absence of system effects. Treatment is controlled removal of exposure followed by symptomatic and supportive care.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Deluge with water.

FIRE / EXPLOSION HAZARDS: Product is non-combustible. On decomposition releases oxygen which may intensify fire. Presence of water accelerates decomposition.

FIRE FIGHTING PROCEDURES: Do not use carbon dioxide or other gas filled fire extinguishers; they will have no effect on decomposing persulfates. Wear full protective clothing and self-contained breathing apparatus.

FLAMMABLE LIMITS: Non-combustible

SENSITIVITY TO IMPACT: No data available

SENSITIVITY TO STATIC DISCHARGE: Not available

6. ACCIDENTAL RELEASE MEASURES

RELEASE NOTES: Spilled material should be collected and put in approved DOT container and isolated for disposal. Isolated material should be monitored for signs of decomposition (fuming/smoking). If spilled material is wet, dissolve with large quantity of water and dispose as a hazardous waste. All disposals should be carried out according to regulatory agencies procedures.

7. HANDLING AND STORAGE

HANDLING: Use adequate ventilation when transferring product from bags or drums. Wear respiratory protection if ventilation is inadequate or not available. Use eye and skin protection. Use clean plastic or stainless steel scoops only.

STORAGE: Store (unopened) in a cool, clean, dry place away from point sources of heat, e.g. radiant heaters or steam pipes. Use first in, first out storage system. Avoid contamination of opened product. In case of fire or decomposition (fuming/smoking) deluge with plenty of water to control decomposition. For storage, refer to NFPA Bulletin 430 on storage of liquid and solid oxidizing materials.

COMMENTS: VENTILATION: Provide mechanical general and/or local exhaust ventilation to prevent release of dust into work environment. Spills should be collected into suitable containers to prevent dispersion into the air.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

Chemical Name	ACGIH	OSHA	Supplier
Sodium Persulfate	0.1 mg/m^3 (TWA)		

ENGINEERING CONTROLS: Provide mechanical local general room ventilation to prevent release of dust into the work environment. Remove contaminated clothing immediately and wash before reuse.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Use cup type chemical goggles. Full face shield may be used.

RESPIRATORY: Use approved dust respirator when airborne dust is expected.

PROTECTIVE CLOTHING: Normal work clothes. Rubber or neoprene footwear.

GLOVES: Rubber or neoprene gloves. Thoroughly wash the outside of gloves with soap and water prior to removal. Inspect regularly for leaks.

9. PHYSICAL AND CHEMICAL PROPERTIES

ODOR:	None
APPEARANCE:	White crystals
AUTOIGNITION TEMPERATURE:	Not applicable. No evidence of combustion up to 800°C. Decomposition will occur upon heating.
BOILING POINT:	Not applicable
COEFFICIENT OF OIL / WATER:	Not applicable
DENSITY / WEIGHT PER VOLUME:	Not available
EVAPORATION RATE:	Not applicable (Butyl Acetate = 1)
FLASH POINT:	Non-combustible
MELTING POINT:	Decomposes
ODOR THRESHOLD:	Not applicable
OXIDIZING PROPERTIES:	Oxidizer
PERCENT VOLATILE:	Not applicable
pH:	typically 5.0 - 7.0 @ 25 °C (1% solution)
SOLUBILITY IN WATER:	73 % @ 25 °C (by wt.)
SPECIFIC GRAVITY:	2.6 (H_2O=1)
VAPOR DENSITY:	Not applicable (Air = 1)
VAPOR PRESSURE:	Not applicable

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID:	Heat, moisture and contamination.
STABILITY:	Stable (becomes unstable in presence of heat, moisture and/or contamination).
POLYMERIZATION:	Will not occur
INCOMPATIBLE MATERIALS:	Acids, alkalis, halides (fluorides, chlorides, bromides and iodides), combustible materials, most metals and heavy metals, oxidizable materials, other oxidizers, reducing agents, cleaners, and organic or carbon containing compounds. Contact

with incompatible materials can result in a material decomposition or other uncontrolled reactions.

HAZARDOUS DECOMPOSITION PRODUCTS: Oxygen that supports combustion and oxides of sulfur.

COMMENTS: PRECAUTIONARY STATEMENT: Pumping and transport of Klozür persulfate requires appropriate precautions and design considerations for pressure and thermal relief.

Decomposing persulfates will evolve large volumes of gas and/or vapor, can accelerate exponentially with heat generation, and create significant and hazardous pressures if contained and not properly controlled or mitigated.

Use with alcohols in the presence of water has been demonstrated to generate conditions that require rigorous adherence to process safety methods and standards to prevent escalation to an uncontrolled reaction.

11. TOXICOLOGICAL INFORMATION

EYE EFFECTS: Non-irritating (rabbit) [FMC Study Number: ICG/T-79.029]

SKIN EFFECTS: Non-irritating (rabbit) [FMC Study Number: ICG/T-79.029]

DERMAL LD_{50}: > 10 g/kg [FMC Study Number: ICG/T-79.029]

ORAL LD_{50}: 895 mg/kg (rat) [FMC Study Number: ICG/T-79.029]

INHALATION LC_{50}: 5.1 mg/l (rat) [FMC I95-2017]

SENSITIZATION: May be sensitizing to allergic persons. [FMC Study Number: ICG/T-79.029]

TARGET ORGANS: Eyes, skin, respiratory passages

ACUTE EFFECTS FROM OVEREXPOSURE: Dust may be harmful and irritating. May be harmful if swallowed.

CHRONIC EFFECTS FROM OVEREXPOSURE: Sensitive persons may develop dermatitis and asthma [Respiration 38:144, 1979]. Groups of male and female rats were fed 0, 300 or 3000 ppm sodium persulfate in the diet for 13 weeks, followed by 5000 ppm for 5 weeks. Microscopic examination of tissues revealed some injury to the gastrointestinal tract at the high dose (3000 ppm) only. This effect is not unexpected for an oxidizer at high concentrations. [Ref. FMC I90-1151, Toxicologist 1:149, 1981].

CARCINOGENICITY:

NTP:	Not listed
IARC:	Not listed
OSHA:	Not listed
OTHER:	ACGIH: Not listed

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION:

Bluegill sunfish, 96-hour LC_{50} = 771 mg/L [FMC Study I92-1250]
Rainbow trout, 96-hour LC_{50} = 163 mg/L [FMC Study I92-1251]
Daphnia, 48-hour LC_{50} = 133 mg/L [FMC Study I92-1252]
Grass shrimp, 96-hour LC_{50} = 519 mg/L [FMC Study I92-1253]

CHEMICAL FATE INFORMATION: Biodegradability does not apply to inorganic substances.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose as a hazardous waste in accordance with local, state and federal regulatory agencies.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (DOT)

PROPER SHIPPING NAME:	Sodium Persulfate
PRIMARY HAZARD CLASS / DIVISION:	5.1 (Oxidizer)
UN/NA NUMBER:	UN 1505
PACKING GROUP:	III
LABEL(S):	5.1 (Oxidizer)
PLACARD(S):	5.1 (Oxidizer)
MARKING(S):	Sodium Persulfate, UN 1505
ADDITIONAL INFORMATION:	Hazardous Substance/RQ: Not applicable

49 STCC Number: 4918733

This material is shipped in 225 lb. fiber drums, 55 lb. poly bags and 1000 - 2200 lb. IBC's (supersacks).

INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG)

PROPER SHIPPING NAME: Sodium Persulfate

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) / INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

PROPER SHIPPING NAME: Sodium Persulfate

OTHER INFORMATION:

Protect from physical damage. Do not store near acids, moisture or heat.

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15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355, APPENDIX A):
Not applicable

SECTION 311 HAZARD CATEGORIES (40 CFR 370):
Fire Hazard, Immediate (Acute) Health Hazard

SECTION 312 THRESHOLD PLANNING QUANTITY (40 CFR 370):
The Threshold Planning Quantity (TPQ) for this product, if treated as a mixture, is 10,000 lbs; however, this product contains the following ingredients with a TPQ of less than 10,000 lbs.:
None

SECTION 313 REPORTABLE INGREDIENTS (40 CFR 372):
Not listed

CERCLA (COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT)

CERCLA DESIGNATION & REPORTABLE QUANTITIES (RQ) (40 CFR 302.4):
Unlisted, RQ = 100 lbs., Ignitability

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA INVENTORY STATUS (40 CFR 710):

Listed

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
RCRA IDENTIFICATION OF HAZARDOUS WASTE (40 CFR 261):
Waste Number: D001

CANADA

WHMIS (WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM):

Product Identification Number: 1505
Hazard Classification / Division: Class C (Oxidizer), Class D, Div. 2, Subdiv. B. (Toxic)
Ingredient Disclosure List: Listed

INTERNATIONAL LISTINGS

Sodium persulfate:
Australia (AICS): Listed
China: Listed
Japan (ENCS): (1)-1131
Korea: KE-12369
Philippines (PICCS): Listed

HAZARD, RISK AND SAFETY PHRASE DESCRIPTIONS:

EC Symbols: (Not classified as hazardous)

EC Risk Phrases: (Not classified as hazardous)

EC Safety Phrases: (Not classified as hazardous)

16. OTHER INFORMATION

HMIS

Health	1
Flammability	0
Physical Hazard	1
Personal Protection (PPE)	J

Protection = J (Safety goggles, gloves, apron & combination dust & vapor respirator)

HMIS = Hazardous Materials Identification System

Degree of Hazard Code:
4 = Severe

3 = Serious
2 = Moderate
1 = Slight
0 = Minimal

NFPA

Health	1
Flammability	0
Reactivity	1
Special	OX

SPECIAL = OX (Oxidizer)

NFPA = National Fire Protection Association

Degree of Hazard Code:
4 = Extreme
3 = High
2 = Moderate
1 = Slight
0 = Insignificant

REVISION SUMMARY:
New MSDS

Klozür and FMC Logo - FMC Trademarks

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KLOZUR

FMC

Technical data

Klozur™

Environmental grade persulfate
CAS No. 7775-27-1

Typical formula by weight percent	$Na_2S_2O_8$	99% MW 238.1 g/mol
Active oxygen content		6.7%
pH of solution strength	**wt%**	**pH**
	20%	5.9
	Note: pH of solution will decrease over time.	

Typical properties	
Odor	none
Appearance	white crystals
Melting point	decomposes
Solubility @ 25°C	73 grms/100 grms H_2O
Loose bulk density, lb/ft³	69.9
Crystal density, g/cc	2.59

Typical metallic impurity concentrations (ppm)	
Iron	2
Copper	<0.2
Chromium	<0.15
Lead	<0.2

Uses
Chemical oxidation of organic contaminants in conjunction with FMC Activation Chemistries

Shipment/container information:
DOT Classification: 5.1 (Oxidizer), yellow Oxidizer label.
55 lb (25 kg) polyethylene bag;
225 lb (102.3 kg) fiber drum with polyethylene liner;
2,200 lb (1,000 kg) woven polypropylene sack with polyethylene liner

HMIS classification:

Health	1
Flammability	0
Physical hazard	1
Personal protection	J

FMC Corporation Active Oxidants Division 1735 Market Street Philadelphia, Pennsylvania 19103 215-299-6000

Klozur® Activated Persulfate

Conference Schedule and News Items

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- About Us
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- Webinars

Applications

Air
- NOx/SOx Abatement

Soil
- Fenton's Chemistry
- Klozur® Activated Persulfates
- Klozur® CR
- Klozur® Activators
- PermeOx Plus

Water
- Waste Water

Customer Resources
- Credit Application
- MSDS
- Sample Request
- Technical Data Sheets
- Sales Resources

Introducing FMC Klozur Persulfate

Klozur activated persulfate is the oxidant of choice for remediation because of its ability to treat a wide range of contaminants. When properly activated, Klozur persulfate provides an unmatched combination of oxidative power and control that can be delivered both safely and cost efficiently.

KLOZUR
Power. Stability. Versatility

Successful field applications of Klozur Activated Persulfate have been performed globally. These applications demonstrate the ability of Klozur activated persulfate to treat diverse organic contaminants of concern including: chlorinated ethenes (TCE, PCE, DCE and vinyl chloride), chlorinated ethanes (TCA and DCA), chlorinated methanes (carbon tetrachloride and methylene chloride), BTEX, MTBE, polyaromatic hydrocarbons (PAHs), petroleum hydrocarbons (TPHs, GRO, DRO), 1,4-dioxane and pesticides.

FMC Activation "Know How"

Klozur activated persulfate generates the sulfate radical ($SO_4^{\cdot-}$), one of the strongest oxidizing species available, giving Klozur persulfate the power to destroy the most recalcitrant of contaminants. However, selection of the "right" activation methods depends on many factors, including: the target contaminants, lithology, hydrogeology, and other specific site conditions.

FMC, pioneering applied oxidation chemistry for more than 60 years, has developed or licensed various patents or patent applications governing the activation of persulfate for environmental applications, including the utilization of metals, chelants, heat, high pH or peroxides. FMC's experts can help you select the best activation method for your site. Contact philip.block@fmc.com

Recently, FMC has coupled the strength of Klozur persulfate with the enhanced aerobic bioremediation capabilites of its PermeOxPlus, engineered calcium peroxide, in an all-in-one combined remedy, Klozur CR. Please visit the Klozur CR page for more information.

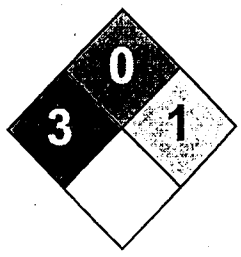
FMC is not only a supplier of high quality chemicals, but also provides site owners, consultants and contractors with a range of support services. Our number one goal is to help make you successful!

- Klozur® persulfate activator selection guidance
- Laboratory services
- Mixing and handling equipment
- Oxidant demand estimation
- Safety guidance

Klozur Resource Center

The Klozur Resource Center contains relevant, up-to-date product information and case studies. Be sure to check back regularly.

ScienceLab.com
Chemicals & Laboratory Equipment



Health	3
Fire	0
Reactivity	2
Personal Protection	J

Material Safety Data Sheet
Sodium hydroxide, Pellets, Reagent ACS MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sodium hydroxide, Pellets, Reagent ACS

Catalog Codes: SLS4090

CAS#: 1310-73-2

RTECS: WB4900000

TSCA: TSCA 8(b) inventory: Sodium hydroxide

CI#: Not available.

Synonym: Caustic Soda

Chemical Name: Sodium Hydroxide

Chemical Formula: NaOH

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Sodium hydroxide	1310-73-2	100

Toxicological Data on Ingredients: Sodium hydroxide LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion, of inhalation. The amount of tissue damage depends on length of contact. Eye contact can result in corneal damage or blindness. Skin contact can produce inflammation and blistering. Inhalation of dust will produce irritation to gastro-intestinal or respiratory tract, characterized by burning, sneezing and coughing. Severe over-exposure can produce lung damage, choking, unconsciousness or death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure of the eyes to a low level of dust can produce eye irritation. Repeated skin exposure can produce local skin destruction, or dermatitis. Repeated inhalation of dust can produce varying degree of respiratory irritation or lung damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: of metals

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive in presence of heat.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:
sodium hydroxide + zinc metal dust causes ignition of the latter. Under proper conditions of temperature, pressure and state of division, it can ignite or react violently with acetaldehyde, ally alcohol, allyl chloride, benzene-1,4-diol, chlorine trifluoride, 1,2 dichlorethylene, nitroethane, nitromethane, nitroparaffins, nitropropane, cinnamaldehyde, 2,2-dichloro-3,3-dimethylbutane. Sodium hydroxide in contact with water may generate enough heat to ignite adjacent combustible materials. Phosphorous boiled with NaOH yields mixed phosphines which may ignite spontanously in air. sodium hydroxide and cinnamaldehyde + heat may cause ignition. Reaction with certain metals releases flammable and explosive hydrogen gas.

Special Remarks on Explosion Hazards:
Sodium hydroxide reacts to form explosive products with ammonia + silver nitrate. Benzene extract of allyl benzenesulfonate prepared from allyl alcohol, and benzene sulfonyl chloride in presence of aquesous sodium hydroxide, under vacuum distillation, residue darkened and exploded. Sodium Hydroxde + impure tetrahydrofuran, which can contain peroxides, can

cause serious explosions. Dry mixtures of sodium hydroxide and sodium tetrahydroborate liberate hydrogen explosively at 230-270 deg. C. Sodium Hydroxide reacts with sodium salt of trichlorophenol + methyl alcohol + trichlorobenzene + heat to cause an explosion.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. If necessary: Neutralize the residue with a dilute solution of acetic acid.

Large Spill:
Corrosive solid. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of acetic acid. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep container dry. Do not breathe dust. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, metals, acids, alkalis, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 23°C (73.4°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor and dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
CEIL: 2 from ACGIH (TLV) [United States] [1995] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Odorless.

Taste: Not available.

Molecular Weight: 40 g/mole

Color: White.

pH (1% soln/water): 13.5 [Basic.]

Boiling Point: 1388°C (2530.4°F)

Melting Point: 323°C (613.4°F)

Critical Temperature: Not available.

Specific Gravity: 2.13 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Easily soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances:
Highly reactive with metals. Reactive with oxidizing agents, reducing agents, acids, alkalis, moisture.

Corrosivity: Not available.

Special Remarks on Reactivity:
Hygroscopic. Much heat is evolved when solid material is dissolved in water. Therefore cold water and caution must be used for this process. Sodium hydroxide solution and octanol + diborane during a work-up of a reaction mixture of oxime and diborane in tetrahyrofuran is very exothermic, a mild explosion being noted on one occassion. Reactive with water, acids, acid chlorides, strong bases, strong oxidizing agents, strong reducing agents, flammable liquids, organic halogens, metals (i.e aluminum, tin, zinc), nitromethane, glacial acetic acid, acetic anhydride, acrolein, chlorohydrin, chlorosulfonic acid, ethylene cyanohydrin, glyoxal, hydrochloric acid, sulfuric acid, hydrosulfuric acid, nitric acid, oleum, propiolactone, acylonitrile, phorosous pentoxide, chloroethanol, chloroform-methanol, tetrahydroborate, cyanogen azide, 1,2,4,5 tetrachlorobenzene, cinnamaldehyde. Reacts with formaldehyde hydroxide to yield formic acid, and hydrogen.

Special Remarks on Corrosivity: Very caustic to aluminum and other metals in presence of moisture.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Causes damage to the following organs: lungs.

Other Toxic Effects on Humans:
Extremely hazardous in case of inhalation (lung corrosive). Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (corrosive), of ingestion, .

Special Remarks on Toxicity to Animals:

Lowest Published Lethal Dose: LDL [Rabbit] - Route: Oral; Dose: 500 mg/kg

Special Remarks on Chronic Effects on Humans: May affect genetic material (mutagenic). Investigation as a mutagen (cytogenetic analysis), but no data available.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: May be harmful if absorbed through skin. Causes severe skin irritation and burns. May cause deep penetrating ulcers of the skin. Eyes: Causes severe eye irritation and burns. May cause chemical conjunctivitis and corneal damage. Inhalation: Harmful if inhaled. Causes severe irritation of the respiratory tract and mucous membranes with coughing, burns, breathing difficulty, and possible coma. Irritation may lead the chemical pneumonitis and pulmonary edema. Causes chemical burns to the respiratory tract and mucous membranes. Ingestion: May be fatal if swallowed. May cause severe and permanent damage to the digestive tract. Causes severe gastrointestinal tract irritation and burns. May cause perforation of the digestive tract. Causes severe pain, nausea, vomiting, diarrhea, and shock. May cause corrosion and permanent destruction of the esophagus and digestive tract.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Sodium hydroxide, solid UNNA: 1823 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Illinois toxic substances disclosure to employee act: Sodium hydroxide Illinois chemical safety act: Sodium hydroxide New York release reporting list: Sodium hydroxide Rhode Island RTK hazardous substances: Sodium hydroxide Pennsylvania RTK: Sodium hydroxide Minnesota: Sodium hydroxide Massachusetts RTK: Sodium hydroxide New Jersey: Sodium hydroxide Louisiana spill reporting: Sodium hydroxide California Director's List of Hazardous Substances: Sodium hydroxide TSCA 8(b) inventory: Sodium hydroxide CERCLA: Hazardous substances.: Sodium hydroxide: 1000 lbs. (453.6 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS E: Corrosive solid.

DSCL (EEC):

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 2

Personal Protection: j

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 1

Specific hazard:

Protective Equipment:
Gloves. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 06:32 PM

Last Updated: 11/06/2008 12:00 PM

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Material Safety Data Sheet

Sodium hydroxide, 8-25% solution in water

ACC# 40176

Section 1 - Chemical Product and Company Identification

MSDS Name: Sodium hydroxide, 8-25% solution in water
Catalog Numbers: NC9136169, NC9260660, NC9590422, NC9680355, NC9783934, NC9856516, SS256-500, SS263-500, SS264-1, SS414-1, SS414-200
Synonyms: Caustic soda; Lye.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7732-18-5	Water	75-92	231-791-2
1310-73-2	Sodium hydroxide	8-25	215-185-5

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: Clear liquid.
Danger! Both liquid and vapor can cause severe burns to all parts of the body. Causes burns by all exposure routes.
Target Organs: Respiratory system, gastrointestinal system, eyes, skin.

Potential Health Effects
Eye: Causes severe eye burns.
Skin: Causes skin burns. May be harmful if absorbed through the skin.
Ingestion: Causes gastrointestinal tract burns. May be harmful if swallowed.
Inhalation: Causes chemical burns to the respiratory tract. May be harmful if inhaled.
Chronic: Prolonged or repeated skin contact may cause dermatitis.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid imme diately.

Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: Do not induce vomiting. Get medical aid immediately. Call a poison control center.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Contact with metals may evolve flammable hydrogen gas.
Extinguishing Media: Use foam, dry chemical, or carbon dioxide.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 3; Flammability: 1; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Wear a self contained breathing apparatus and appropriate personal protection. (See Exposure Controls, Personal Protection section). Provide ventilation. Do not let this chemical enter the environment.

Section 7 - Handling and Storage

Handling: Do not get in eyes, on skin, or on clothing. Do not ingest or inhale. Use only in a chemical fume hood.
Storage: Store in a cool, dry place. Store in a tightly closed container.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Water	none listed	none listed	none listed
Sodium hydroxide	2 mg/m3 Ceiling	10 mg/m3 IDLH	2 mg/m3 TWA

OSHA Vacated PELs: Water: No OSHA Vacated PELs are listed for this chemical. Sodium hydroxide: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear chemical splash goggles. Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: Clear
Odor: none reported
pH: Alkaline
Vapor Pressure: 14 mm Hg
Vapor Density: >1.0
Evaporation Rate: Not available.
Viscosity: >1 (ether=1)
Boiling Point: 100 deg C
Freezing/Melting Point:0 deg C
Decomposition Temperature: Not available.
Solubility: Soluble.
Specific Gravity/Density:1.0
Molecular Formula: NaOH.H2O
Molecular Weight: Not available.

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, excess heat.
Incompatibilities with Other Materials: Strong oxidizing agents, acids, metals, chlorinated solvents.
Hazardous Decomposition Products: Sodium oxide.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 7732-18-5: ZC0110000
CAS# 1310-73-2: WB4900000
LD50/LC50:
CAS# 7732-18-5:
Oral, rat: LD50 = >90 mL/kg;

CAS# 1310-73-2:
Draize test, rabbit, eye: 400 ug Mild;
Draize test, rabbit, eye: 1% Severe;
Draize test, rabbit, eye: 50 ug/24H Severe;
Draize test, rabbit, eye: 1 mg/24H Severe;
Draize test, rabbit, skin: 500 mg/24H Severe;

Carcinogenicity:
CAS# 7732-18-5: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 1310-73-2: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: No information found
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. No information available.
Environmental: No information available.
Physical: No information available.
Other: Do not empty into drains.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	SODIUM HYDROXIDE SOLUTION	SODIUM HYDROXIDE SOLUTION
Hazard Class:	8	8
UN Number:	UN1824	UN1824
Packing Group:	II	II

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 7732-18-5 is listed on the TSCA inventory.
CAS# 1310-73-2 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 1310-73-2: 1000 lb final RQ; 454 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 1310-73-2: immediate, reactive.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 1310-73-2 is listed as a Hazardous Substance under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 7732-18-5 is not present on state lists from CA, PA, MN, MA, FL, or NJ.
CAS# 1310-73-2 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

C

Risk Phrases:

R 35 Causes severe burns.

Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 37/39 Wear suitable gloves and eye/face protection.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/Protection)

CAS# 7732-18-5: No information available.
CAS# 1310-73-2: 1

Canada - DSL/NDSL

CAS# 7732-18-5 is listed on Canada's DSL List.

CAS# 1310-73-2 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of E.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 1310-73-2 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 5/20/1998
Revision #9 Date: 11/06/2007

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

SODIUM HYDROXIDE SOLUTIONS (MORE THAN 10% NaOH)

1. Product Identification

Synonyms: Caustic soda solution; lye solution; sodium hydroxide liquid; sodium hydrate solution,Sodium Hydroxide Concentrate Solution StandARd®, Sodium Hydroxide, DILUT-IT® Analytical Concentrates, sodium hydroxide volumetric solutions
CAS No.: 1310-73-2
Molecular Weight: 40.00
Chemical Formula: NaOH in water
Product Codes:
J.T. Baker: 0312, 0337, 0338, 0339, 0342, 0344, 0392, 0895, 0896, 0897, 3719, 3720, 3725, 3727, 3729, 3730, 3735, 4689, 4690, 5000, 5007, 5661, 5666, 5668, 5669, 5671, 5672, 5674, XL-347
Mallinckrodt: 6290, 7701, 7702, 7703, 7705, 7706, 7775, H369, H382, H385, V038, V679

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Sodium Hydroxide	1310-73-2	10 - 60	Yes
Water	7732-18-5	40 - 90	No

3. Hazards Identification

Emergency Overview

POISON! DANGER! CORROSIVE. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED. CAUSES BURNS TO ANY AREA OF CONTACT. REACTS WITH WATER, ACIDS AND OTHER MATERIALS.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)
Flammability Rating: 0 - None
Reactivity Rating: 2 - Moderate
Contact Rating: 4 - Extreme (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: White Stripe (Store Separately)

Potential Health Effects

Inhalation:
Severe irritant. Effects from inhalation of mist vary from mild irritation to serious damage of the upper respiratory tract, depending on severity of exposure. Symptoms may include sneezing, sore throat or runny nose. Severe pneumonitis may occur.
Ingestion:
Corrosive! Swallowing may cause severe burns of mouth, throat, and stomach. Severe scarring of tissue and death may result. Symptoms may include bleeding, vomiting, diarrhea, fall in blood pressure. Damage may appear days after exposure.
Skin Contact:
Corrosive! Contact with skin can cause irritation or severe burns and scarring with greater exposures.
Eye Contact:
Corrosive! Causes irritation of eyes, and with greater exposures it can cause burns that may result in permanent impairment of vision, even blindness.
Chronic Exposure:
Prolonged contact with dilute solutions or dust has a destructive effect upon tissue.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems or impaired respiratory function may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
Ingestion:
DO NOT INDUCE VOMITING! Give large quantities of water or milk if available. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician, immediately. Wash clothing before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:
Perform endoscopy in all cases of suspected sodium hydroxide ingestion. In cases of severe esophageal corrosion, the use of therapeutic doses of steroids should be considered. General supportive measures with continual monitoring of gas exchange, acid-base balance, electrolytes, and fluid intake are also required.

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard. Hot or molten material can react violently with water.
Can react with certain metals, such as aluminum, to generate flammable hydrogen gas.
Explosion:
May cause fire and explosions when in contact with incompatible materials.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire. Adding water to caustic solution generates large amounts of heat.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Keep unnecessary and unprotected people away from area of spill. Wear appropriate personal protective equipment as specified in Section 8. Contain and recover liquid when possible. Do not flush caustic residues to the sewer. Residues from spills can be diluted with water, neutralized with dilute acid such as acetic, hydrochloric or sulfuric. Absorb neutralized caustic residue on clay, vermiculite or other inert substance and package in a suitable container for disposal.
US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker NEUTRACIT®-2 or BuCAIM® caustic neutralizers are recommended for spills of this product.

7. Handling and Storage

Keep in a tightly closed container. Protect from physical damage. Store in a cool, dry, ventilated area away from sources of heat, moisture and incompatibilities. Store above 16C (60F) to prevent freezing. Always add the caustic to water while stirring; never the reverse. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Do not store with aluminum or magnesium. Do not mix with acids or organic materials.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
- OSHA Permissible Exposure Limit (PEL):
2 mg/m3 Ceiling
- ACGIH Threshold Limit Value (TLV):
2 mg/m3 Ceiling
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half facepiece particulate respirator (NIOSH type N95 or better filters) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest.. A full-face piece particulate respirator (NIOSH type N100 filters) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Physical data is displayed for 10%, 30% and 50% aqueous sodium hydroxide solutions. (Merck Index).
Appearance:
Clear, colorless solution.
Odor:
Odorless.
Solubility:
Completely miscible with water.
Density:
10% solution = 1.11; 30% solution = 1.33; 50% solution = 1.53
pH:
14.0 (10%, 30% and 50% solutions)
% Volatiles by volume @ 21C (70F):
No information found.
Boiling Point:
For 10% solution = 105C (221F); for 30% solution = 115C (239F); for 50% solution = 140C (284F).
Melting Point:
For 10% solution = -10C (14 F); for 30% solution = 1C (34F); for 50% solution = 12C (53.6F).
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
13 @ 60C (140F) (50% solution)
Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Sodium oxide. Decomposition by reaction with certain metals releases flammable and explosive hydrogen gas.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Sodium hydroxide in contact with acids and organic halogen compounds, especially trichloroethylene, may causes violent reactions. Contact with nitromethane and other similar nitro compounds causes formation of shock-sensitive salts. Contact with metals such as aluminum, magnesium, tin, and zinc cause formation of flammable hydrogen gas. Sodium hydroxide, even in fairly dilute solution, reacts readily with various sugars to produce carbon monoxide. Precautions should be taken including monitoring the tank atmosphere for carbon monoxide to ensure safety of personnel before vessel entry.
Conditions to Avoid:
Heat, moisture, incompatibles.

11. Toxicological Information

Sodium hydroxide: irritation data: skin, rabbit: 500 mg/24H severe; eye rabbit: 50 ug/24H severe. Investigated as a mutagen.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Sodium Hydroxide (1310-73-2)	No	No	None
Water (7732-18-5)	No	No	None

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: SODIUM HYDROXIDE SOLUTION
Hazard Class: 8
UN/NA: UN1824
Packing Group: II
Information reported for product/size: 360LB

International (Water, I.M.O.)

Proper Shipping Name: SODIUM HYDROXIDE, SOLUTION
Hazard Class: 8
UN/NA: UN1824
Packing Group: II
Information reported for product/size: 360LB

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Sodium Hydroxide (1310-73-2)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Sodium Hydroxide (1310-73-2)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Sodium Hydroxide (1310-73-2)	No	No	No	No
Water (7732-18-5)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Sodium Hydroxide (1310-73-2)	1000	No	No
Water (7732-18-5)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: Yes (Mixture / Liquid)

Australian Hazchem Code: 2R
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **1**
Label Hazard Warning:
POISON! DANGER! CORROSIVE. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED. CAUSES BURNS TO ANY AREA OF CONTACT. REACTS WITH WATER, ACIDS AND OTHER MATERIALS.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe mist.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen. In all cases get medical attention immediately.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 9.
Disclaimer:
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